



USER GUIDE Version 6
2024

Table of Contents

[Introduction](#)

[Licensing & Installation](#)

[Online Activation](#)

[Offline Activation](#)

[Sharing Media and Clips for DRS™NOVA](#)

[The Three Steps to Sharing](#)

[1. Configuring access to the Shared Media](#)

[2. Specifying the Clip Directory for the Project Manager](#)

[3. Configuring History](#)

[The DRS™Nova Keyboard Stickers](#)

[User Interface Overview](#)

[Windows](#)

[Main Screen](#)

[The Toolbar Ribbon](#)

[Preferences](#)

[General](#)

[Frame Cache](#)

[Display Window](#)

[Player Playback Speed](#)

[Display LUT](#)

[GPU](#)

[The Tool Palette](#)

[Display Modes](#)

[Regular Display](#)

[Full Screen - press \](#)

[Presentation Mode - press SHIFT+\](#)

[Presentation with Timecode or Frame #s - press L when in Presentation](#)

[Presentation with Tool Palette/Bar - press SHIFT+L when in Presentation](#)

[Waveform Monitor](#)

[Help Menu](#)

[DRS™Nova Feedback App](#)

[Introduction](#)

[Overview](#)

[Using DRS Nova Feedback](#)

- [File location for zip files](#)
 - [The Log section](#)
 - [The Feedback Text Box](#)
 - [The Feedback Image Window](#)
 - [\(the balance of the page left blank on purpose\)](#)
 - [Sending Feedback](#)
- [Zooming and Positioning](#)
 - [Using the Mouse Wheel and Left or Right Clicking](#)
 - [Using the Y and U key](#)
- [The Project Manager](#)
 - [Determining where your project metadata will be stored](#)
 - [Creating a Project](#)
 - [Creating Bins](#)
 - [Importing Files to Create Master Clips](#)
 - [Importing the Clip\(s\)](#)
 - [Creating a Sub-Clip of an Existing Master Clip](#)
 - [Moving Clips from Bin to Bin](#)
 - [The Master Clips Context Menu](#)
 - [Edit Comments...](#)
 - [Change DPX Header Frame Rate...](#)
 - [Remove Alpha Channel from Media Files...](#)
 - [Relink Media Folder...](#)
 - [Clip Properties...](#)
 - [The Version Context Menu](#)
 - [Count Number of Fixes...](#)
 - [Timelines](#)
 - [Context Menus of the Timelines](#)
 - [Sizing the Timeline](#)
 - [Preparing a clip for work](#)
 - [Run Cut Detection](#)
 - [Marking a Shot In to Out](#)
 - [Cut Navigation Tips](#)
 - [Bookmark Timeline and Bookmark Event Viewer](#)
 - [Timeline Only Bookmarks](#)
 - [Timeline Only Shortcut Keys](#)
 - [Bookmark Event Viewer](#)
 - [Bookmarking a Frame or Range of Frames](#)

[Modifying Marks of a Bookmark Event](#)

[Deleting a Bookmark Event](#)

[Exporting a Bookmark Report](#)

[Importing a Bookmark Report](#)

[Creating Versions](#)

[Creating a Version of a Version](#)

[Discarding Changes in a Version or Version of Version](#)

[Committing Versions](#)

[Deleting Versions](#)

[Exporting Versions](#)

[Copying Frames in Marked Ranges](#)

[Using the Motion Tools](#)

[Camera Motion](#)

[Initiating the Analysis](#)

[Moving Between Motion Segments](#)

[Changing a Motion Segment](#)

[Changing the Segments Display](#)

[Camera Motion Tool Shortcut Keys](#)

[MTai Frame Generation](#)

[Jump Cut](#)

[Fixing a Jump Cut](#)

[Slug](#)

[Fixing a Middle Slug](#)

[Fixing Head Slugs](#)

[Fixing Tail Slugs](#)

[Understanding History Files and "GOV"](#)

[Showing / Hiding History](#)

[Get Original Values Drawing Modes](#)

[Using GOV to Undo Fixes](#)

[Mask Tool](#)

[Mask Tool Bar Button Functions](#)

[Mask Properties Window](#)

[Mask Properties Buttons](#)

[Drawing and Manipulating Masks](#)

[Drawing](#)

[Selecting and Deselecting](#)

[Sizing a Mask](#)

[Rotating a Mask](#)

[Manipulating the shape of a Mask](#)

[Moving a Mask](#)

[Working with Multiple Masks](#)

[Working with Keyframes](#)

[Adding and Deleting Keyframes](#)

[Using Automated Mask Tracking](#)

[Simple Steps to Track an Object and Attach a Mask:](#)

[Split Screen and Side by Side Views](#)

[Split Screen View](#)

[Entering Split Screen View](#)

[Controlling the Split Screen Divider](#)

[Changing the Angle of the Split](#)

[Side by Side View](#)

[Entering Side by Side View](#)

[Preview Fix Mode](#)

[Previewing a Tool Fix in the Split Screen View:](#)

[Previewing a Tool Fix in Side by Side View:](#)

[Dual Clip Mode](#)

[Zoom QC Mode](#)

[Overview](#)

[ROI Mode](#)

[Quad Mode](#)

[Global Shortcut Keys](#)

[LUTs](#)

[Creating a DRS™Nova 1D LUT Look](#)

[Creating and Naming a New 1D LUT](#)

[Deleting a User Defined 1D LUT](#)

[Importing and Exporting a DRS™Nova Generated 1D LUT](#)

[To Apply a Clip LUT to another Clip](#)

[Importing a Cube LUT](#)

[Removing a Cube LUT](#)

[Creating and Using Aspect Ratio Reticles](#)

[To create a user defined reticle](#)

[Reticles Shortcut Keys](#)

[Using Presets](#)

[Selecting and Recalling Presets](#)

[Saving Presets](#)

[Selecting a Preset without Recalling the Saved Values](#)

[Using the AutoMark Function](#)

[Using the DRS™ Tool](#)

[Modes of Operation](#)

[Low and High Motion](#)

[Hard Motion](#)

[Replace](#)

[Auto Replace](#)

[Mode Overrides](#)

[Using the Grain Tool Presets for Grain Override in DRS™](#)

[Drawing the Fix](#)

[Quick Select](#)

[Toggling Between the Fix and the Original Pixels](#)

[Rejecting or Accepting Pending Fixes](#)

[Repeat Last Action](#)

[DRS™ Shortcut Keys](#)

[Using the Scratch Tool](#)

[Scratch Tool Operation](#)

[Using the PDL](#)

[Scratch Shortcut Keys](#)

[Using the Paint Tool](#)

[Modes of Operation](#)

[Common Functions for all Paint Modes](#)

[Selecting a Paintbrush.](#)

[Auto Align](#)

[Paint or Erase](#)

[Modify the Stroke Set](#)

[Using the Grain Tool's Presets for the Grain Override](#)

[Rejecting or Accepting Pending Strokes](#)

[Instant Macro](#)

[Use Current Transform](#)

[Reverse Paint Mode](#)

[Using Masks in the Paint Tool](#)

[Tracking](#)

[Setting up Tracking for a Shot:](#)

[Use Tracking Data](#)

[Reveal](#)

[Choosing a Source Frame](#)

[Determining whether the Source Frame is Absolute or Relative](#)

[Clone Mode](#)

[Choosing a Source Frame](#)

[Determining whether the Set Point is Relative or Absolute.](#)

[Choosing the Clone Set Point.](#)

[Color Mode](#)

[Picking a color from the color palette](#)

[Using the Eye Dropper](#)

[Using the Bucket](#)

[Original Values Mode](#)

[Get Original Values \(GOV\)](#)

[Alternate Clip Mode](#)

[Paint Shortcut Keys](#)

[Using the Debris Filter Tools](#)

[Using AutoFilter](#)

[ROI Mode](#)

[AutoFilter - Filter Sets](#)

[Parameters](#)

[Example Usage](#)

[Processing Debris Filter on Single Frames](#)

[Using Mask in Debris Filter](#)

[Using the Alpha Filter](#)

[Using a PDL \(Process Decision List\)](#)

[Using Shine](#)

[Max Size](#)

[Min Size](#)

[Contrast Sensitivity](#)

[Motion](#)

[Edge](#)

[Shine Alpha Filter](#)

[Using Motion Analysis with Shine](#)

[Navigating to Next or Previous Motion Segments](#)

[Protecting and Locking Motion Segments](#)

[Disabling and Locking Motion Segments](#)

[Setting Parameter Values for a Segment and Rippling them in Shine](#)

[Auto-Saving Segment Settings](#)
[AutoFilter and Shine Shortcut Keys](#)
[Shine only Shortcut Keys](#)
[Using the 3 Layer Registration Tool](#)
[Viewing a Single Channel](#)
[Auto Per Shot Mode](#)
[Auto Per Frame Mode](#)
[Manual Mode](#)
[Reference Frame Mode](#)
[Apply Correction to Preview Frame Only](#)
[Analysis and Processing Region](#)
[Using the PDL](#)
[3 Layer Shortcut Keys](#)
[Using the Deflicker Tool](#)
[Preparing a Clip for Analysis](#)
[Using the PDL](#)
[Using Presets](#)
[Saving or Recalling a Preset](#)
[Saving a Preset](#)
[Recalling a Preset](#)
[Using the Mistime Module](#)
[Manual](#)
[Auto](#)
[Mistime Shortcut Keys](#)
[Using the Global Module](#)
[Region of Interest \(ROI\)](#)
[Graph](#)
[Keyframe Controls](#)
[Understanding Absolute versus Average Keyframes](#)
[Understanding the Absolute Keyframe](#)
[Understanding the Average Keyframe](#)
[Presets - Saving and Recalling](#)
[Adding and Deleting Keyframes](#)
[Navigating to Keyframes](#)
[Previewing Corrections](#)
[Shots and Groups](#)
[Global Module Shortcut Keys](#)

[Using the Zonal Deflicker Module](#)

[Zonal Flicker Explained](#)

[Steps for Zonal Deflicker](#)

[Process Channels](#)

[Draw the ROI \(Region of Interest\)](#)

[Blend \(ROI\)](#)

[Constraints](#)

[Boxes and Temporal Smoothing](#)

[Ghost Suppression](#)

[Use Motion Analysis](#)

[Beginning the Analysis](#)

[Previewing the Correction](#)

[Using Motion Analysis with Zonal Deflicker](#)

[Navigating to Next or Previous Motion Segments](#)

[Protecting and Locking Motion Segments](#)

[Disabling and Locking Motion Segments](#)

[Setting Parameter Values for a Segment and Rippling them](#)

[Auto-Saving Segment Settings](#)

[Zonal Module Hotkeys](#)

[Using the Stabilize Tool](#)

[Steps for Manual Stabilization](#)

[1. Processing Region](#)

[2. Establish IN and OUT Marks for Processing.](#)

[3. Establish settings:](#)

[4. Place a Tracking Point](#)

[5. Tracking the Points](#)

[6. Preview or Render](#)

[7. Moving, Saving, Loading, Clearing Tracking Points](#)

[Moving](#)

[Saving](#)

[Loading](#)

[Clearing Tracking Points](#)

[Using Tracking Offsets](#)

[Using Presets](#)

[Using a PDL in Manual Stabilization Mode](#)

[Adding one shot at a time to the PDL](#)

[Adding all shots in the clip to the PDL](#)

[Saving and Rendering the PDL](#)

[Auto-Stabilization](#)

[Source is Animation](#)

[Using Motion Analysis with Auto-Stabilization](#)

[Navigating to Next or Previous Motion Segments](#)

[Protecting and Locking Motion Segments](#)

[Disabling and Locking Motion Segments](#)

[Rippling a Status](#)

[Using a PDL in Auto-Stabilization Mode](#)

[Stabilization Shortcut Keys](#)

[Using the Dewarp Tool](#)

[Save Tracking Points](#)

[Load Tracking Points](#)

[Clear on Shot Change.](#)

[Using the PDL](#)

[Using the Presets](#)

[Dewarp Shortcut Keys](#)

[Using the Grain Tool](#)

[Grain Reduce](#)

[Aperture](#)

[How to Save Presets for the Grain Reduce and Aperture Functions](#)

[Create Grain](#)

[How to Save Presets for the Create Grain Function](#)

[Using Mask in Grain](#)

[Using the PDL](#)

[Grain Tool Hotkeys](#)

Introduction

Welcome to DRS™NOVA, the first and leading digital film restoration software used by companies and archives the world over to restore their films to a pristine state. DRS™NOVA consists of multiple modules developed to address the myriad of issues encountered in the film restoration process. It is designed with the artist in mind, intended to be easy to learn while providing a comprehensive toolset. DRS™NOVA is resolution independent so you can work in any resolution for files that are image sequences including DPX, TIFF, or EXR.

Enjoy restoring your films and visit <http://forum.mtifilm.com/> for helpful hints and suggestions.

Here is a list of all the available modules:

Project Management

Powerful Tools to manage your media

Camera Motion Analysis

Analyze camera motion for static, low, and high motion. Allows for discrete settings per motion type available in Deflicker/Zonal, Stabilization/Auto, and Debris/Shine

MTai - Frame Generation (requires a separate “MTI Extras” download)

Generate new interpolated frames to fix “slugs” and “jump cuts” using machine learning.

Mistimes, Global, and Zonal DeFlicker

Automatically fix printer mistimes, reduce Global and Zonal density and color shifts to eliminate flicker and color breathing due to emulsion fading.

Stabilize & Dewarp

Repair jitter, gate weave, splice bumps and geometric distortions

3 Layer

Realign mis-registered RGB layers, including individual channel warping

Debris Filters

Automatically detect and repair dust and defects across a range of frames with two filters, AutoFilter and Shine. Shine is a new filter that works “surgically” resulting in less artifacts. AutoFilter uses a more aggressive algorithm that is less discriminating.

DRS™

The original unique digital film restoration algorithm manually fixes dust, debris, scratches, tears and more

Scratch

Repairs persistent scratches

Paint

The Paint tool offers complete precision for manual and automated fixes of everything from dust and debris to film tears and gate hairs

Grain Management & Image Sharpening

Reduce grainy or noisy images, Create grain patterns and sharpen images

Licensing & Installation

The DRS™NOVA installer is available on the MTI Film Support Forum:

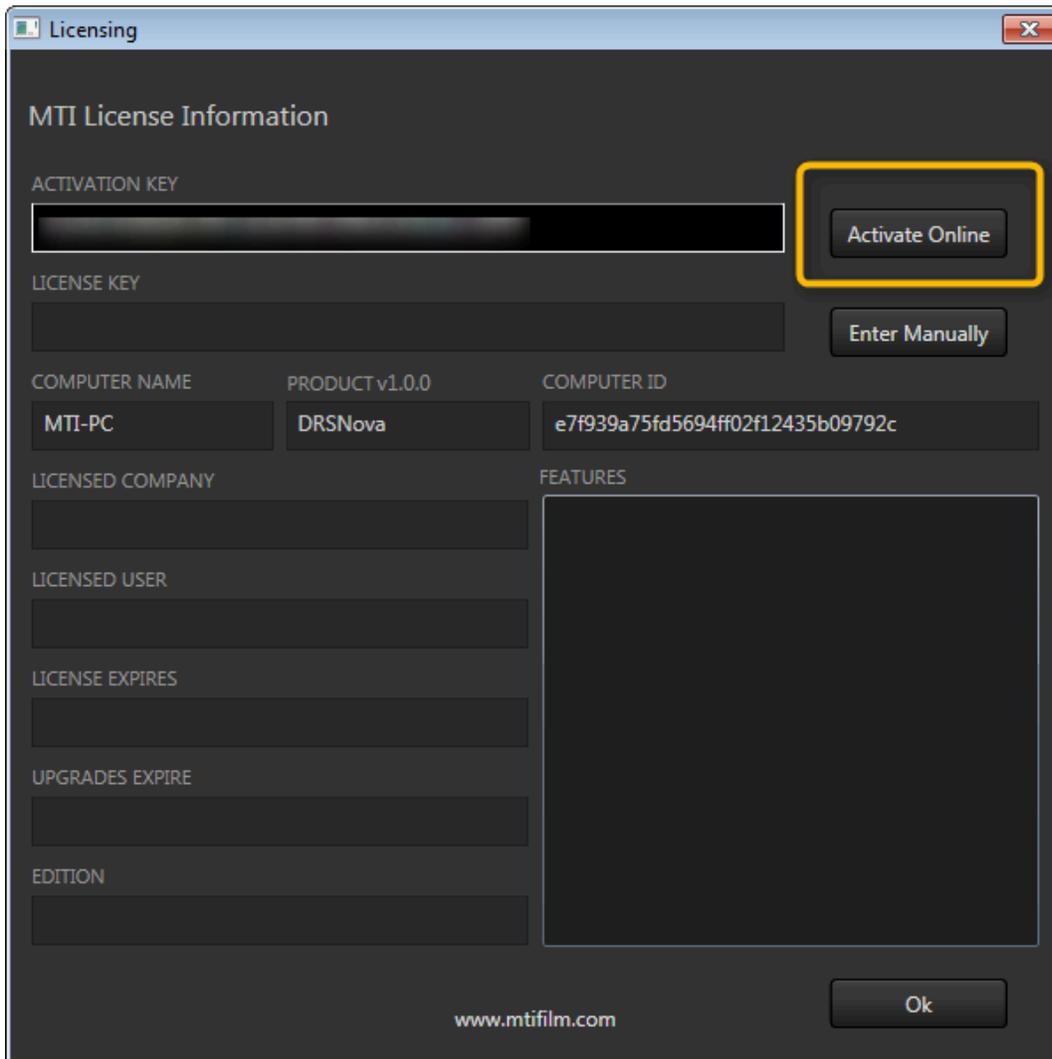
<http://forum.mtifilm.com/t/drs-nova-installer/263>

DRS™NOVA requires certain prerequisites, such as .NET, be installed. If your workstation is online during installation, the installer will guide you through downloading and installing these. If you will be offline, please download and install these prerequisites manually from

<http://forum.mtifilm.com/t/drs-nova-installer-prerequisites/383>

Online Activation

DRS™NOVA uses key-based licensing. If you are online, you can use the key provided by MTI Film Support to automatically contact our licensing server to activate.



The screenshot shows a window titled "Licensing" with a dark theme. The main heading is "MTI License Information". Below this, there are several input fields and buttons:

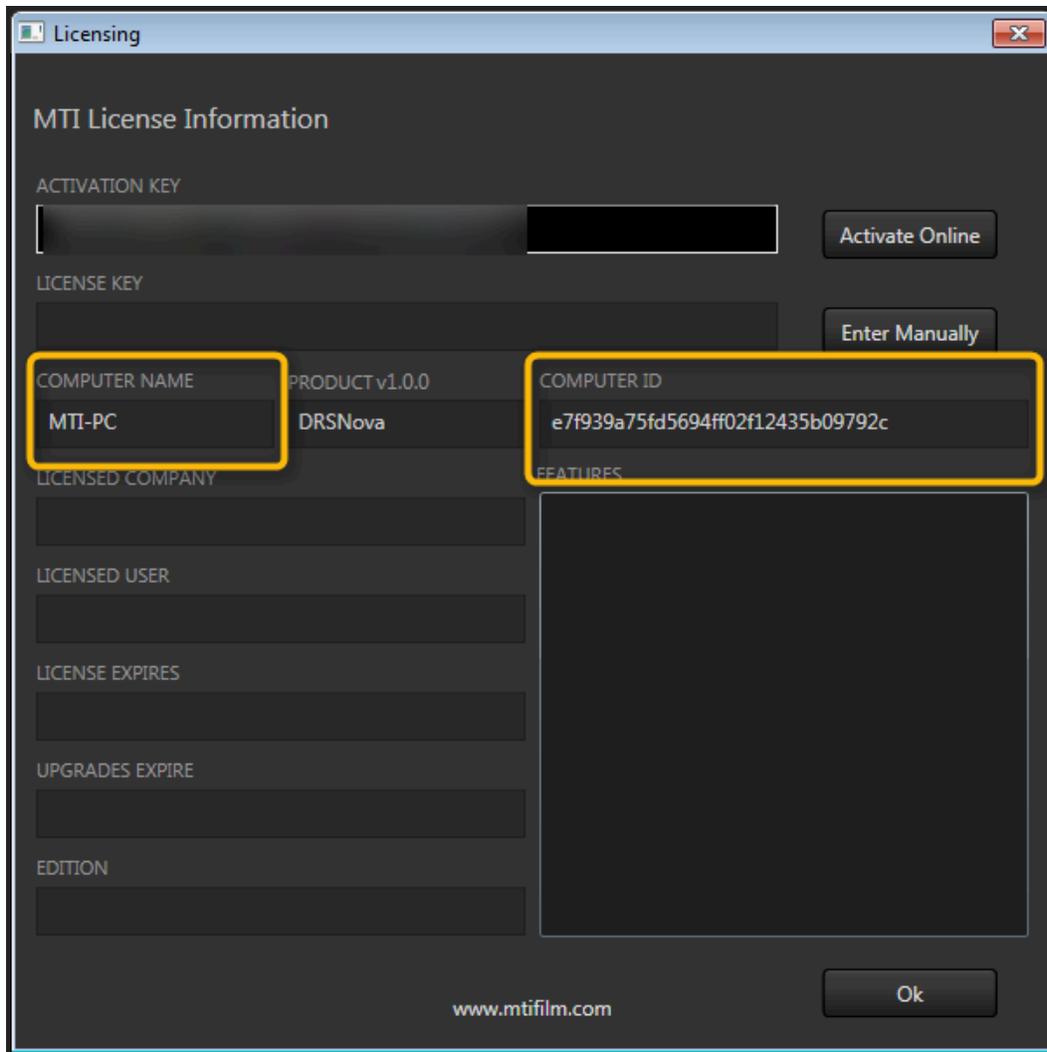
- ACTIVATION KEY:** A text input field with a yellow box around the "Activate Online" button to its right.
- LICENSE KEY:** A text input field with an "Enter Manually" button to its right.
- COMPUTER NAME:** A dropdown menu showing "MTI-PC".
- PRODUCT v1.0.0:** A dropdown menu showing "DRSNova".
- COMPUTER ID:** A text field showing "e7f939a75fd5694ff02f12435b09792c".
- LICENSED COMPANY:** A text input field.
- LICENSED USER:** A text input field.
- LICENSE EXPIRES:** A text input field.
- UPGRADES EXPIRE:** A text input field.
- EDITION:** A text input field.
- FEATURES:** A large empty text area.

At the bottom of the window, there is a "www.mtifilm.com" label and an "Ok" button.

Offline Activation

If your DRS™NOVA workstation is not connected to the internet, you can use the Manual Activation process instead. You must provide your machine name and ID to MTI Film Support and we will respond with a License Key.

Please copy & paste the info from the window into a text file or body of an email to ensure accurate licensing.



The screenshot shows a window titled "Licensing" with the following fields and buttons:

- ACTIVATION KEY**: A text input field with a button labeled "Activate Online" to its right.
- LICENSE KEY**: A text input field with a button labeled "Enter Manually" to its right.
- COMPUTER NAME**: A text input field containing "MTI-PC".
- PRODUCT v1.0.0**: A text input field containing "DRSNova".
- COMPUTER ID**: A text input field containing "e7f939a75fd5694ff02f12435b09792c".
- LICENSED COMPANY**: A text input field.
- LICENSED USER**: A text input field.
- LICENSE EXPIRES**: A text input field.
- UPGRADES EXPIRE**: A text input field.
- EDITION**: A text input field.
- FEATURES**: A large text area.
- Ok**: A button at the bottom right.
- www.mtifilm.com**: A URL at the bottom center.

To Activate Manually once you have both keys:

1. Enter the **Activation Key**
2. Click **Enter Manually**
3. Enter the manual **License Key**
4. Click **OK**

Sharing Media and Clips for DRS™NOVA

This section is intended for new users who have environments containing multiple workstations and desire to share media and project management of user created clips. For single workstation users, the installation of the software provides all the variables required to begin working without further intervention. While this section is not intended for current or single workstation users, it can be informative and should be reviewed.

DRS™NOVA can be configured so that multiple Windows workstations can share the same Project Manager and media location. This document describes how to set up the directory locations of Media files, Clip metadata and History files generated by the program so that all workstations can share DRS™NOVA's Project Manager. MTI Film only supports the type of sharing described in this document. MTI Film supports Windows 7 and Windows 10 operating systems. Windows 10 is recommended.

The Three Steps to Sharing

There are three steps needed in setting up a shared system:

1. Configuring the Shared Media location such as a SAN or NAS
2. Specifying the Clip Directory for the Project Manager
3. Specifying where History files are saved

1. Configuring access to the Shared Media

- a. The shared media drive location, usually a SAN (Storage Area Network) or NAS (Network Attached Storage), must be mapped to the same local drive letter for every workstation. For example, Y:
- b. The permissions for that drive location must provide the ability to create folders and Read/Write files for all folders and subfolders at every workstation in the environment.

Note: At this time, MTI Film does not support Windows UNC (uniform naming convention). The mapping of drive letters to UNC names is beyond the scope of this document.

2. Specifying the Clip Directory for the Project Manager

All clips' metadata are located in a common directory folder named `MTIBins`. Each workstation has access to this shared folder location through the system wide environment variable `CPMP_SHARED_DIR`. The DRS™NOVA Project Manager reflects the directory structure of this location.

For example, in order to set the clip directory to `Y:\MTIShare\MTIBins`, open an **administrator** command prompt (run as administrator) on each workstation and enter:

```
setx CPMP_SHARED_DIR Y:\MTIShare /m
```

Notice the `MTIBins` is not specified in this command; it is automatically created. You can copy the above command, change the drive letter if required, and paste it in the command prompt for ease of installation.

Note: In DRS™NOVA, media is represented as clips created by the user. Different clips can share the same media folder as long as the clips do not include the same frame ranges. For example, if a media folder contains 1000 dpx files numbered from 0000 to 1000, and two different clips contain ranges 0000 to 0500 and 0501 to 1000 respectively, then it is permissible to have two different workstations access the media folder simultaneously provided each workstation works exclusively on one of the clips at a time. Because there is no locking, it is important that no two workstations work on the same clip or any version of the clip at the same time. To avoid confusion, it is highly recommended that each clip contain the name of the person working on it in the "Comment" field provided in the Project Manager.

3. Configuring History

History files are generated by certain tools in DRS™NOVA. A History file contains those portions of the original file that were replaced by fixes made by the tool. For example, a manual fix performed on a small area of dirt by the DRS™ tool generates a small History file containing the original pixels. As more fixes are made to a frame, the History file size increases. This allows the user to recall the original pixels if required.

History files can be stored in the same directory as the media or in a separate directory structure. The default installation is to create the History folder, named "History" within the media folder. This is the recommended configuration and requires no additional user intervention.

In order to save History in a location separate from the media you must edit the following file for each workstation as follows :

```
C:\ProgramData\MTI Film\DRS Nova\MTILocalMachine.ini
```

Find this line:

```
#MetadataRootDirectory=$(CPMP_SHARED_DIR)MTIMetadata
```

For example, to change the History location to Y:\MtiHistory

Replace

```
#MetadataRootDirectory=$(CPMP_SHARED_DIR)MTIMetadata
```

with

```
MetadataRootDirectory= Y:\MtiHistory
```

Note: Remember to remove the comment token #

If this line is not in the `MTILocalMachine.ini` file, find this line

```
[Metadata]
```

and immediately after it add the line:

```
MetadataRootDirectory= Y:\MtiHistory
```

If the `[Metadata]` line is not in the file, then add these two lines at the bottom of the file:

```
[Metadata]
```

```
MetadataRootDirectory= Y:\MtiHistory
```

Note: Again, this must be done for every workstation.

A word of warning. Changing this value is possible but will only change it for clips that are created after the change even if you move the directory to the new location. In fact moving it will mean the old history is no longer available.

The DRS™ Nova Keyboard Stickers

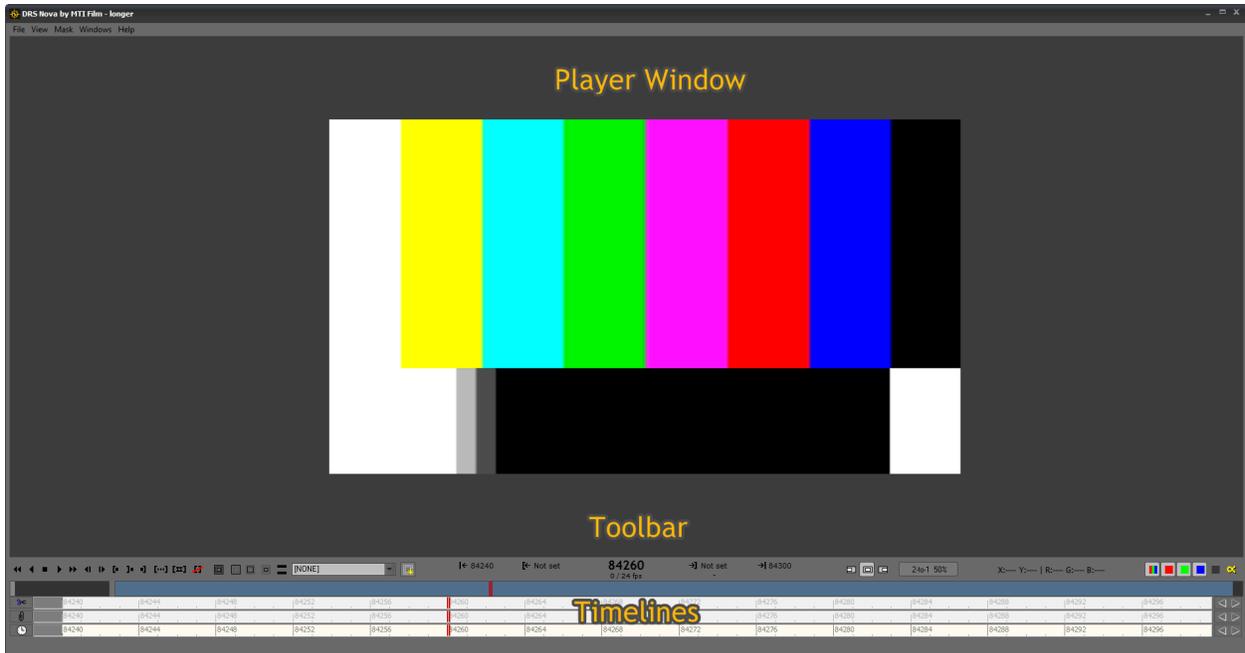
The keyboard stickers, when applied to a user supplied American style QWERTY keyboard, makes it easier to navigate and issue commands. It is supplied with every new license purchase and is available for purchase for \$30 including standard postage.



User Interface Overview

Windows

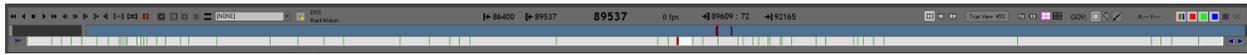
Main Screen



The Main Screen includes

- The **Player Window**, where the clip is displayed
- The **Toolbar Ribbon** area, which includes navigation and display buttons
- The **Timelines** - One or more timelines can be displayed below the Player Window

The Toolbar Ribbon



The Toolbar Ribbon consists of various “widgets” that represent:

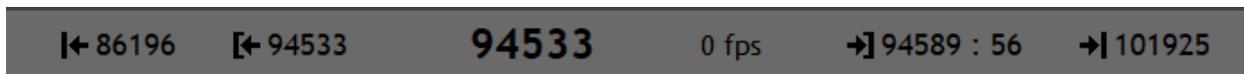
1. Navigation and Mark buttons



2. Aspect Ratio and Reticle Displays

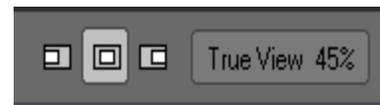


3. Frame number or Timecode Position/Marks/Duration depending on display selection



4. Player Window position and Viewing Mode:

- a. Position the player left, center, or right
- b. Use True View to size the image to the resolution your monitor supports (press Z to see the full image)
- c. Use the Absolute Percentage view to size the image from 9-to-1 to 1-to-20 including 1-to-1 for pixel to pixel viewing.



To toggle between True View and Absolute Percentage View, click the button

5. Split Screen and Side by Side Viewing Mode buttons



6. Quad Split - Zoom Review Mode for QC



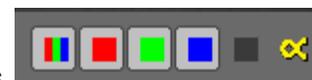
7. GOV (Get Original Values) Mode Selection



8. X/Y Cursor Positions



9. Color Channels, Black and White and Alpha Channel Displays

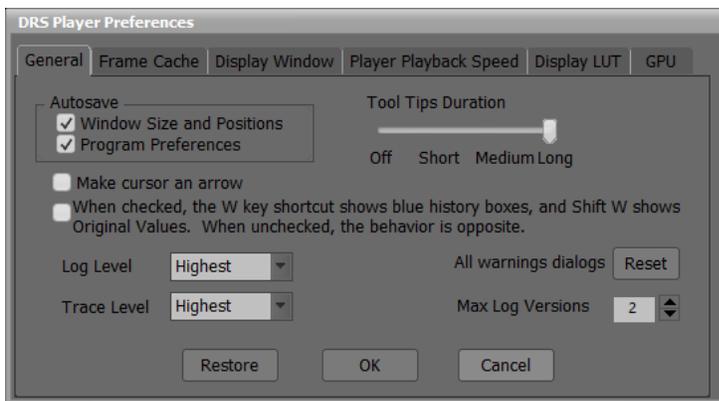


Preferences

The Preferences dialog window found in the File menu contains a number of tabs related to behaviors that the user can adjust.

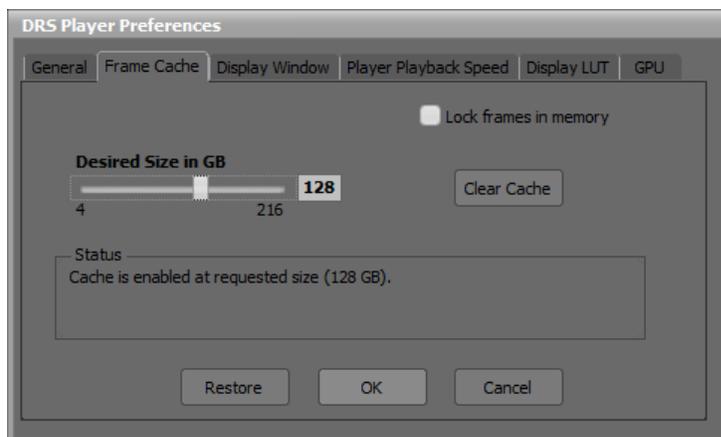
General

The General tab provides items related to appearance, History button behavior, and Logging of tool operations. The operations log is continually saved as you use the application. If you encounter an issue and want to send it to the support team, you can send the log to MTI as explained later in this document in the “Help” section found here: [Help Menu](#).



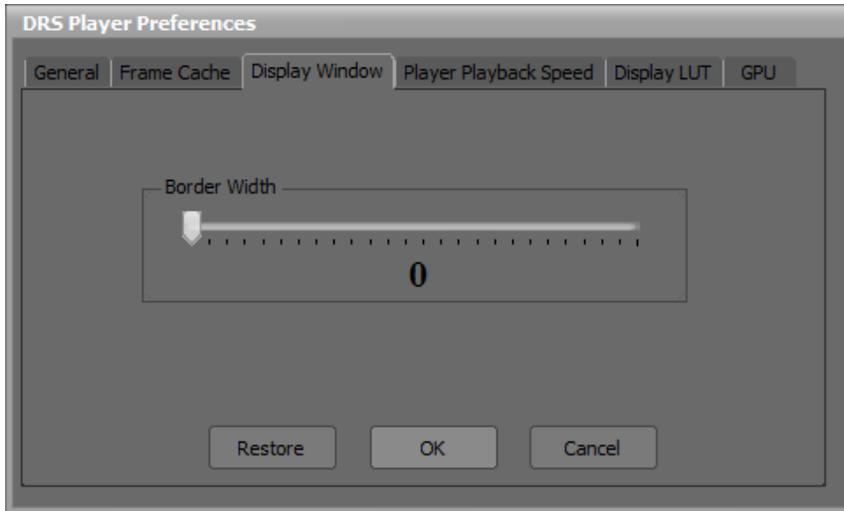
Frame Cache

The Frame Cache allows you to determine how much of the available RAM will be used. If you need to Clear Cache, use this tab. Since DRS™NOVA uses the cache for playback, if you manually replace frames in a clip they might not appear in the player until you “[Clear Cache](#)”.



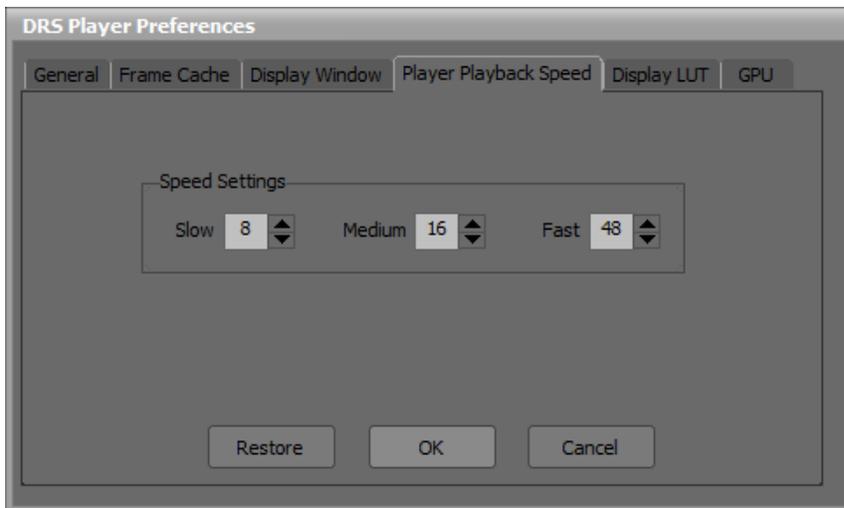
Display Window

The Display Window allows you to set a border width for the player display. 0 is recommended.



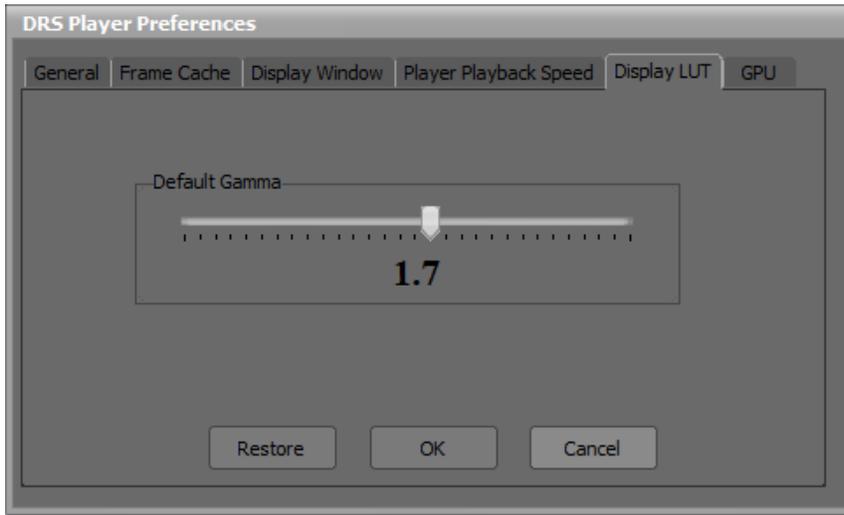
Player Playback Speed

The Player Playback Speed sets the frame rates of the options found in the View Menu, which only affect Player playback speeds.



Display LUT

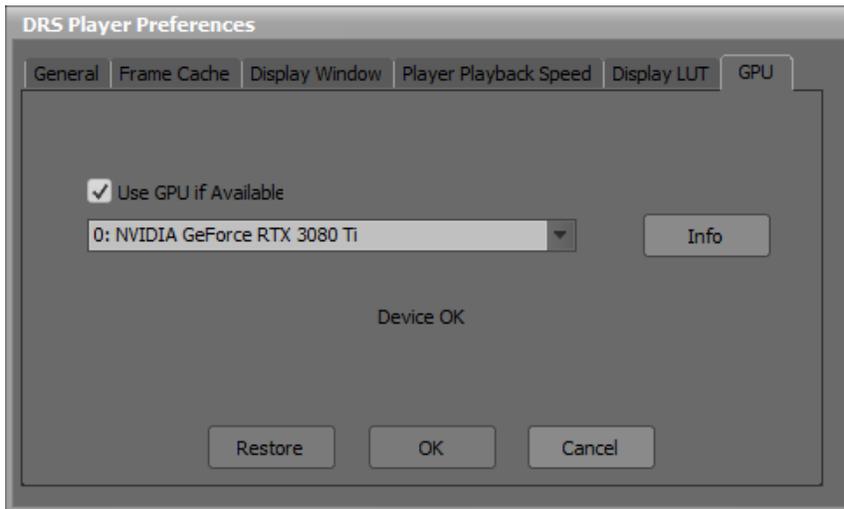
Use the Display LUT to determine the default Gamma value.



GPU

In this version of DRS™Nova, a GPU is required for analysis and rendering of certain tools

1. Auto-Stabilization and Deflicker analysis and rendering
2. Rendering of Manual Stabilization and Dewarp.
3. MTai Frame Generation (4090ti recommended)

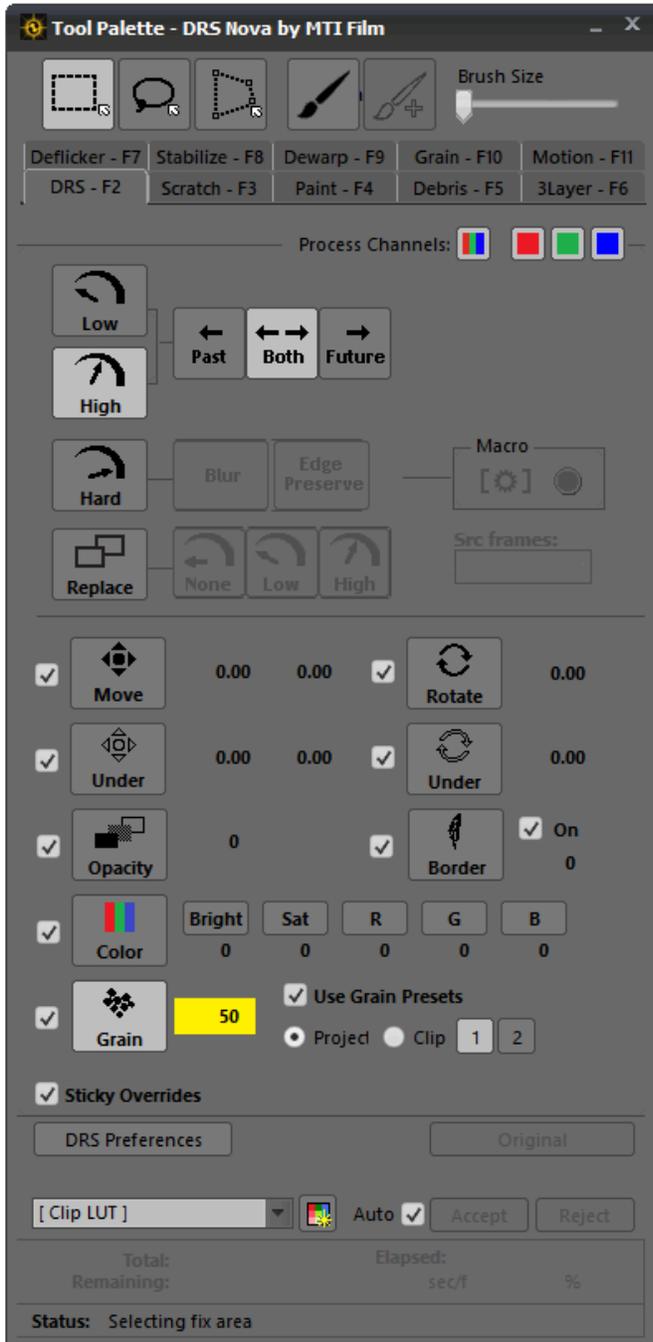


Use a GPU model of, at least, RTX 4080 Super. Above that is acceptable too.

The Tool Palette

The Tool Palette contains all of the tools in the DRS™NOVA suite.

Show or Hide the Tool Palette with the . (period) key



Display Modes

DRS™ NOVA includes a number of Display Modes to help you work most efficiently:

- Regular Display includes all menu and toolbars
- Full Screen removes the menu bar. Toggle Full Screen with the \ key
- Presentation Mode displays the Player Window Only. Toggle Presentation with **SHIFT+V**
- Presentation Mode with Frame Numbers or Timecode (depending on display selection). Add the overlay with **L**
- Presentation Mode with Tool Palette and Toolbar - adds the Tool Palette and Tool Bar overlays during “Stop” only, with **SHIFT+L**.

Regular Display



Full Screen - press \



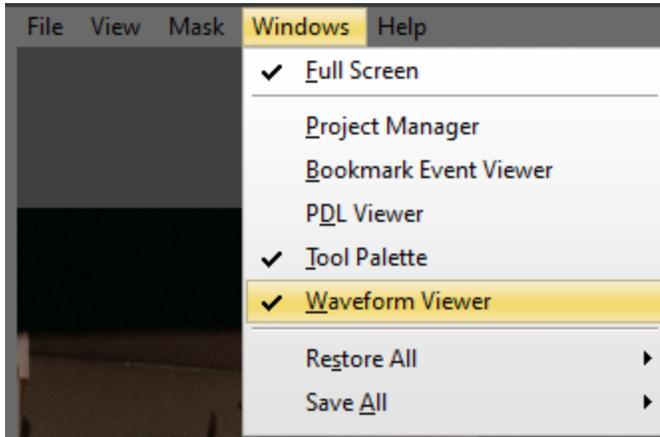
Presentation Mode - press SHIFT+\



Presentation with Timecode or Frame #s - press L when in Presentation

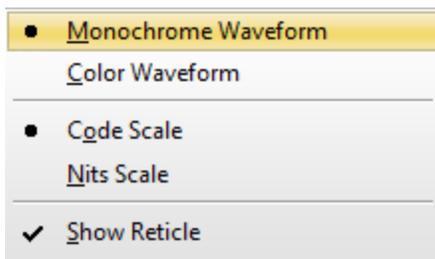
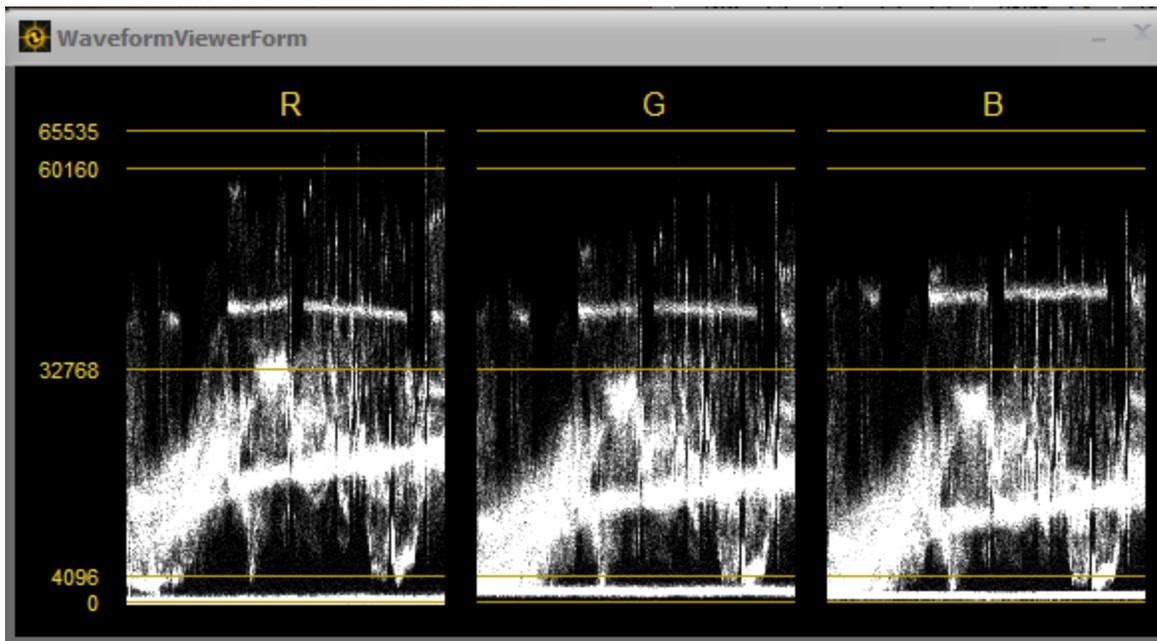


Waveform Monitor



As of version 6, a waveform “parade” has been added. To enable the waveform, press F12 or click Windows/Waveform Viewer.

F12 toggles the Waveform On/Off
Shift F12 toggles the reticle On/Off

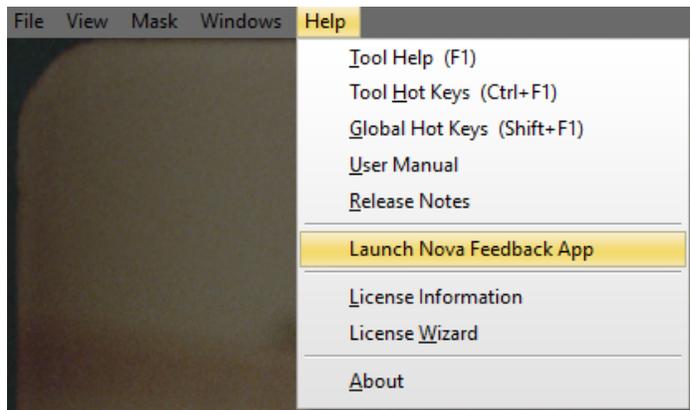


Right click on the waveform to enable the context menu to choose from the various available options.

NOTE: The Waveform monitor reflects values of the “raw” file only and not applied LUTs.

Help Menu

The Help menu is located in the main window's file menu. To access the help menu, click on the Help text or press ALT+H when the file menu is visible.



DRS™ Nova Feedback App

The Nova Feedback Application provides the means to send “log” information to our support team.

Introduction



The DRS™ Nova Feedback program is a stand alone program that may be launched from within the Help menu from DRS_Nova version 5.5 or newer, or from a Desktop icon that is placed on the desktop when a version containing the app is installed, or the Windows Start Menu | MTI Film | DRS_Nova_Feedback.

Its purpose is to make it easy to send the operations log and, optionally, an image of an error dialog or a clip image. An optional text description can also be included.

The purpose of making the app stand alone is to ensure that if the program crashes or freezes you can launch the Feedback app and send log information to the support team.

Overview

DRS™ Nova collects information and errors in a log file. A new log file is created each time DRS™ Nova is run. Even if the program is unresponsive, this log file may contain useful information about an issue. By default, the last five versions of this log are kept. This number kept may be changed in the File|Preferences..|General menu

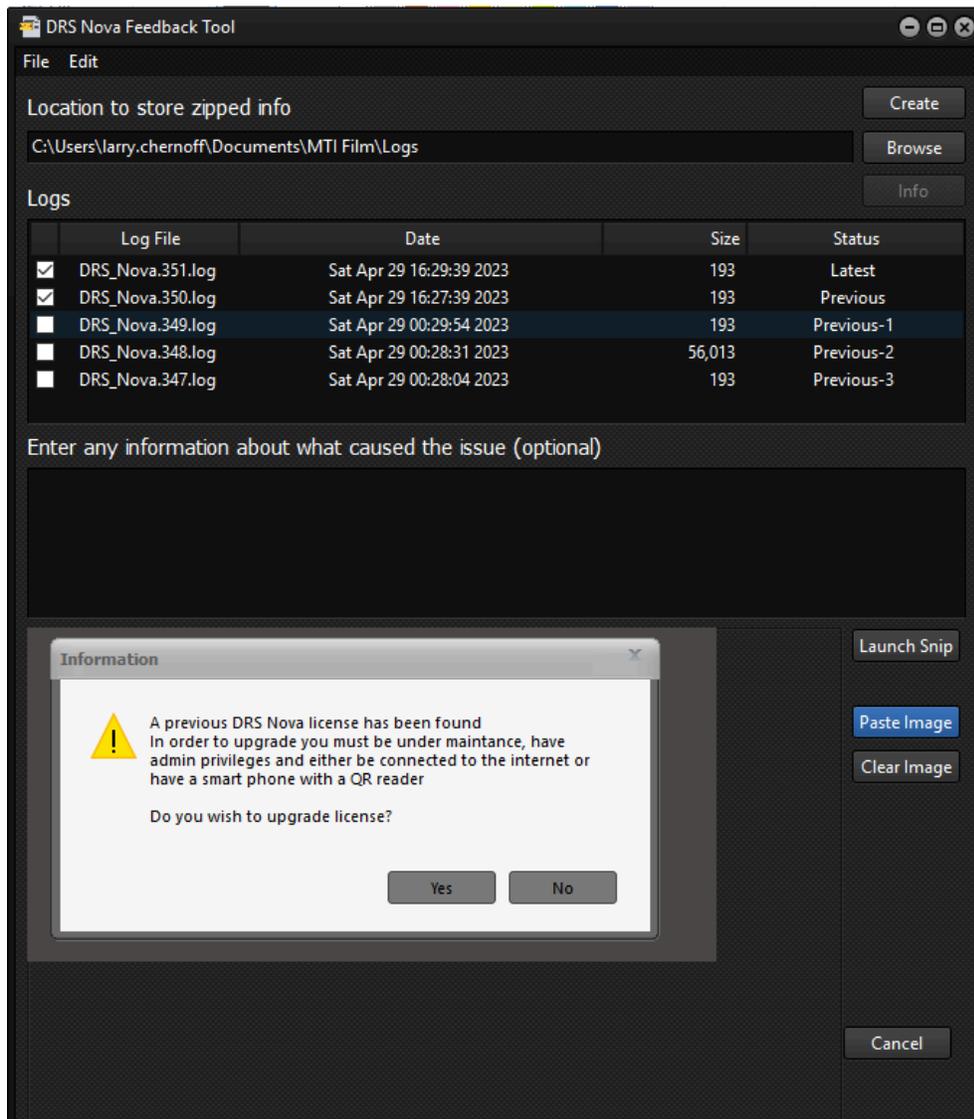
By default, the last two logs, together with any description and image are created to a zip file. This zip file should be attached and sent to support@mtifilm.com

The file name contains an identifier of the program as well as the date and time of the file creation. If you have a valid service contact, support will reply to you. If you do not have a service contract, you will not receive a reply.

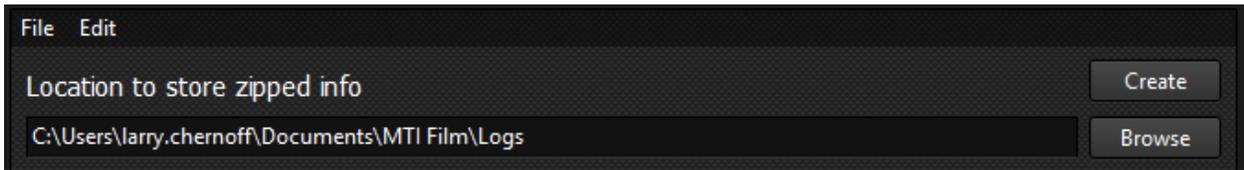
Only one instance of the feedback tool can be running at any time. If the tool is minimized, and launched again, then the feedback tool will be un-minimized.

Using DRS Nova Feedback

When launched, the DRS™Nova Feedback App window will be displayed. For example:

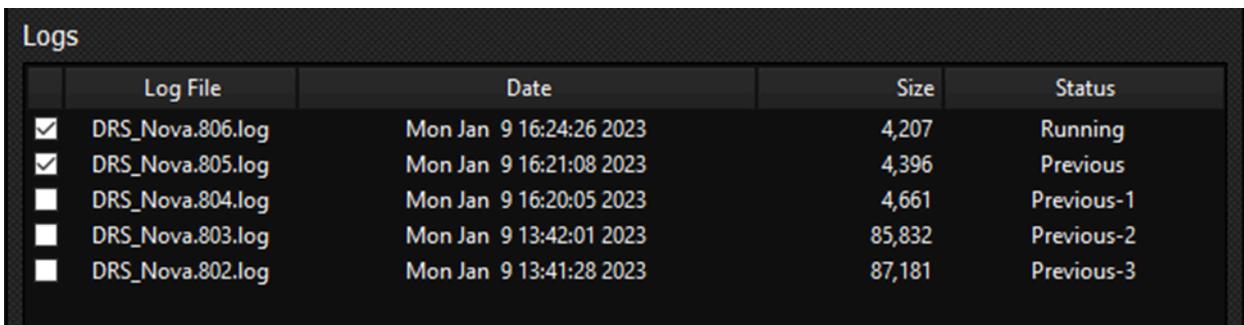


File location for zip files



This is the directory used to store the zipped files. Zipped files are never deleted so they will accumulate until deleted manually.

The Log section



	Log File	Date	Size	Status
<input checked="" type="checkbox"/>	DRS_Nova.806.log	Mon Jan 9 16:24:26 2023	4,207	Running
<input checked="" type="checkbox"/>	DRS_Nova.805.log	Mon Jan 9 16:21:08 2023	4,396	Previous
<input type="checkbox"/>	DRS_Nova.804.log	Mon Jan 9 16:20:05 2023	4,661	Previous-1
<input type="checkbox"/>	DRS_Nova.803.log	Mon Jan 9 13:42:01 2023	85,832	Previous-2
<input type="checkbox"/>	DRS_Nova.802.log	Mon Jan 9 13:41:28 2023	87,181	Previous-3

This displays the existing logs in the MTI log directory (usually C:\Users\\.cpmp). The first column shows which logs will be incorporated into the zip file. The default is the last two, however you can enable all the checkboxes if desired. You can also inspect (using notepad) any log by double clicking on the row.

The Status column shows how recent each log file is relative to the current log. If DRS_Nova is active, then the status will be “Running”, otherwise “Latest”.

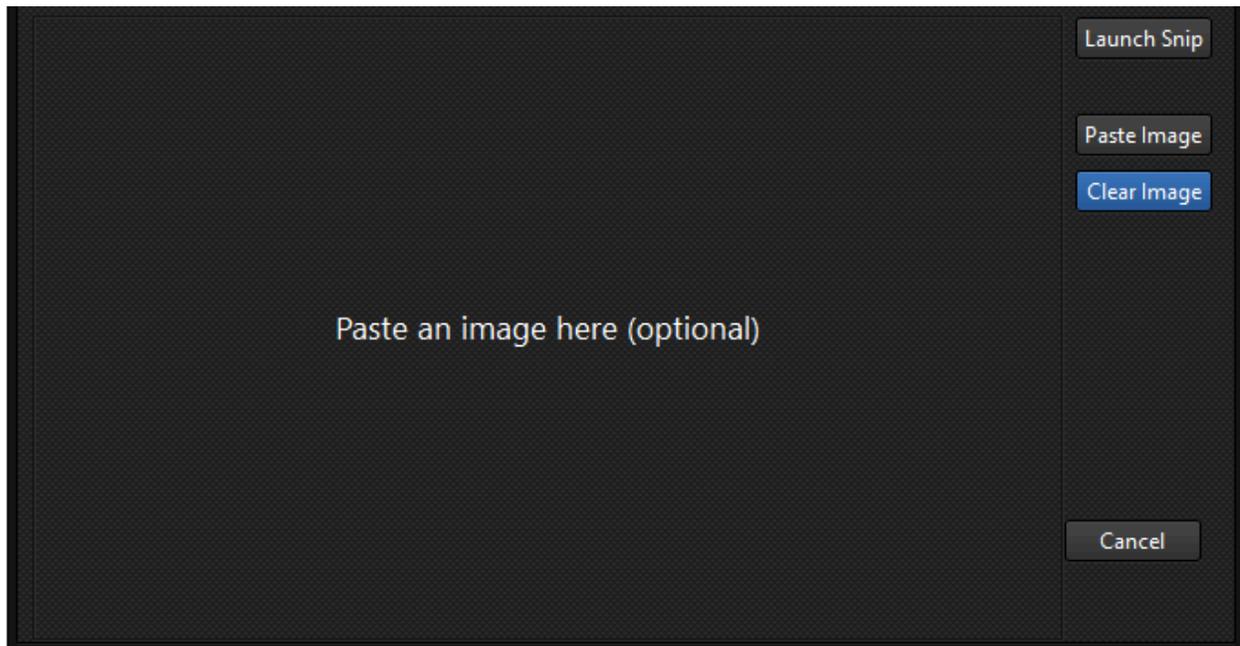
The remaining columns are self-explanatory.

The Status will update dynamically; however, the Size or Date is not dynamic.

The Feedback Text Box

This is a plain text field that can be used optionally to add additional information.

The Feedback Image Window



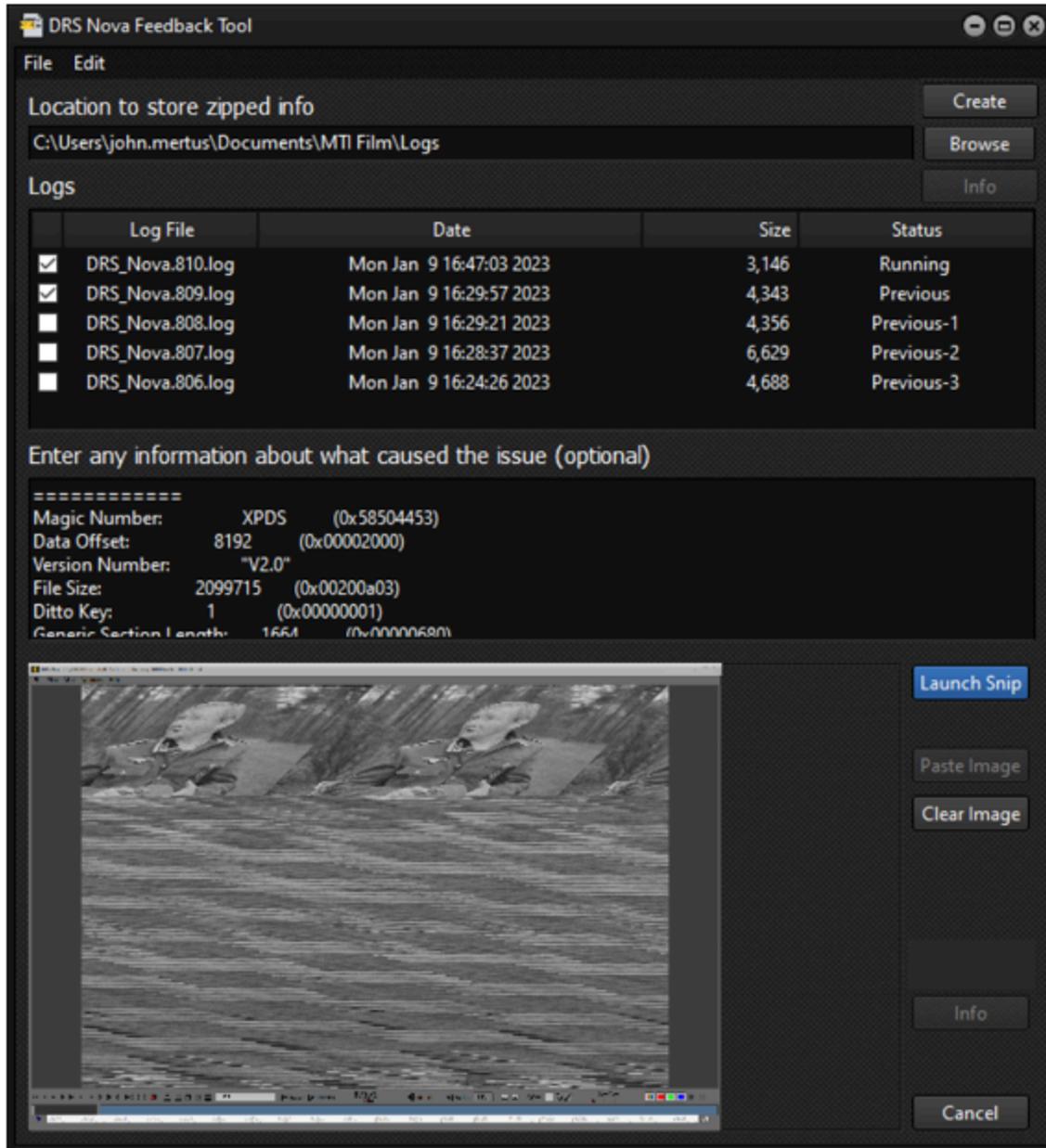
This is very useful for sending a dialog box or the clip image. Any image in the clipboard may be pasted into this window.

The **Launch Snip** button launches the Windows Snipping Tool or the newer Snip & Sketch. Choose which one to be used by clicking Edit|Options in the Feedback App. After snipping an image (or copying to the clipboard from other tools such as Paint) the **Paste Image** button will be enabled. Clicking it will paste the clipboard image into the window shown above.

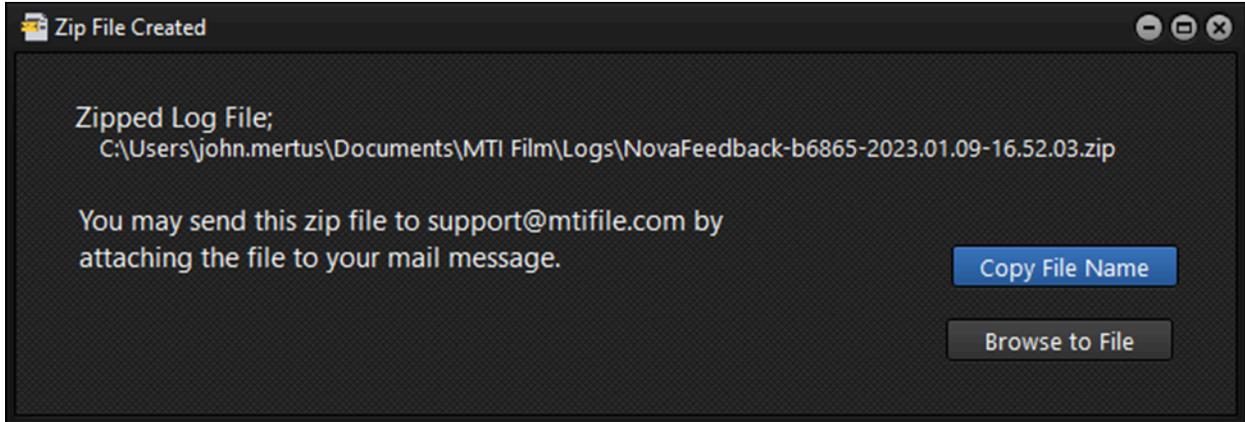
(the balance of the page left blank on purpose)

Sending Feedback

This is an example of a DPX file that failed to read. The DPX Header was pasted into the description and the image shows the problem.

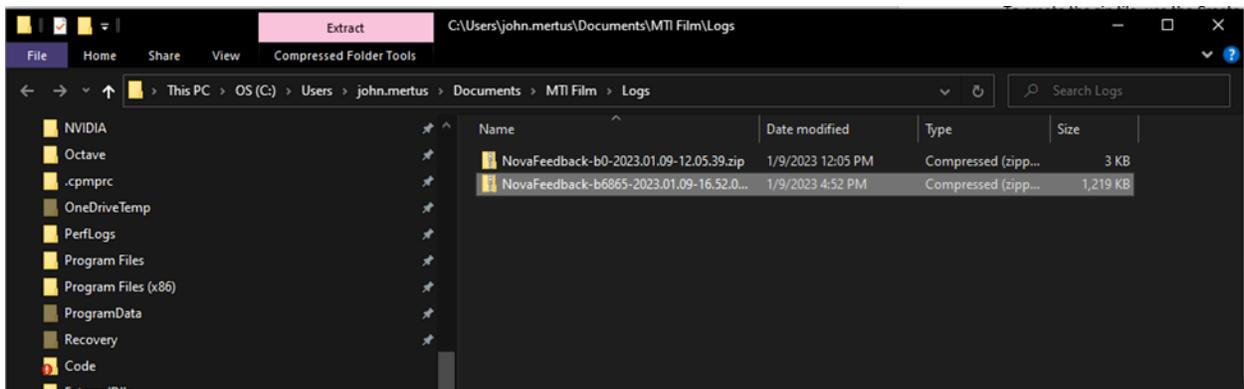


To create the zip file, use the Create button. This will bring up the following dialog box.

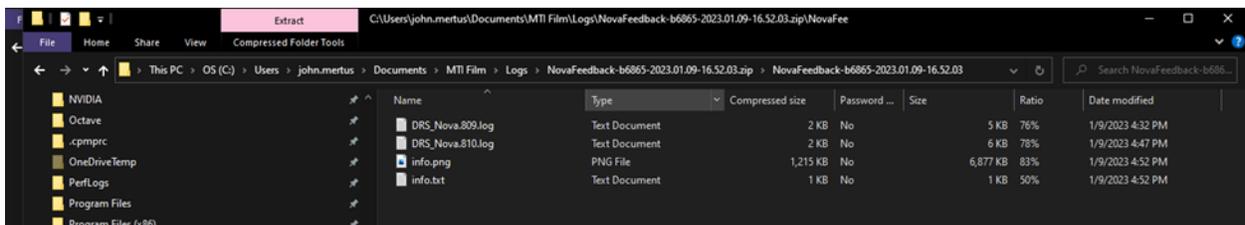


The **Copy File Name** places the complete file name in the clipboard. In this example it is C:\Users\john.mertus\Documents\MTI Film\Logs\NovaFeedback-b6865-2023.01.09-16.52.03.zip

The **Browse to File** button opens an Explorer window and highlights the created zip file.



The file can either be mailed to support@mtifilm.com or, if there is no internet access, sent to a computer with internet access. If you expand the zip file using Explorer, the following files will be found.



Zooming and Positioning

There are two methods of zooming and positioning the picture.

1. Using the Mouse Wheel and Left or Right Clicking
2. Using the Y key to zoom and, separately, holding down the U key while moving the mouse for positioning.

Using the Mouse Wheel and Left or Right Clicking

1. Press and hold the Z key 
 - a. Position the cursor to the portion of frame to be zoomed
 - b. Use the mouse wheel to zoom in and out
 - c. After zooming, click and hold the left or right mouse button and drag to position the picture
 - d. To return the picture to full view, release the Z key and press it again once.

When holding the Z key, the use of the mouse is exclusive to zoom/position and will not affect the current tool's settings.

Using the Y and U key

1. Zooming
 - a. Press the Y key repeatedly to zoom in steps to the cursor position
 - b. Press SHIFT+Y repeatedly to zoom out in steps
 - c. Press the Z key once to return the picture to full view
2. Positioning
 - a. After zooming, press and hold the U key
 - b. Move the mouse to position the picture (no clicking is necessary)
 - c. Press the Z key once to return the picture to full view

The Project Manager

Determining where your project metadata will be stored

When you first install DRS™NOVA, the location where project metadata is stored is automatically created on your boot drive (normally c:\) in a folder named MTIShare. If you wish to move it to another location follow the instructions below:

1. Move the existing C:\MTIShare folder and all its contents to wherever you want the data to live, for example on the R: drive, so it becomes R:\MTIShare.
- 1 (alt). Or if you don't care about what's in C:\MTIShare you can just delete it completely.
2. Find the hidden folder .cpmprc in your user home directory (something like C:\Users***username***\.cpmprc). Delete the file named DRS_Nova.ini .
3. Set the system environment variable CPMP_SHARED_DIR to the value - R:\MTIShare\

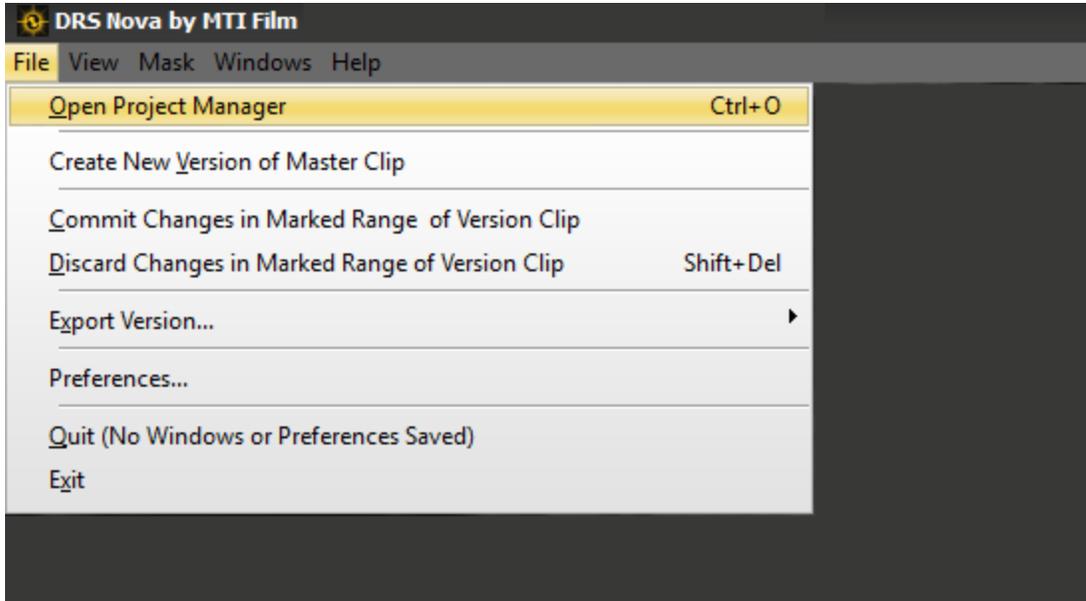
Note the trailing "\" - it is necessary!!

In case you don't know how to set a system environment variable in Windows:

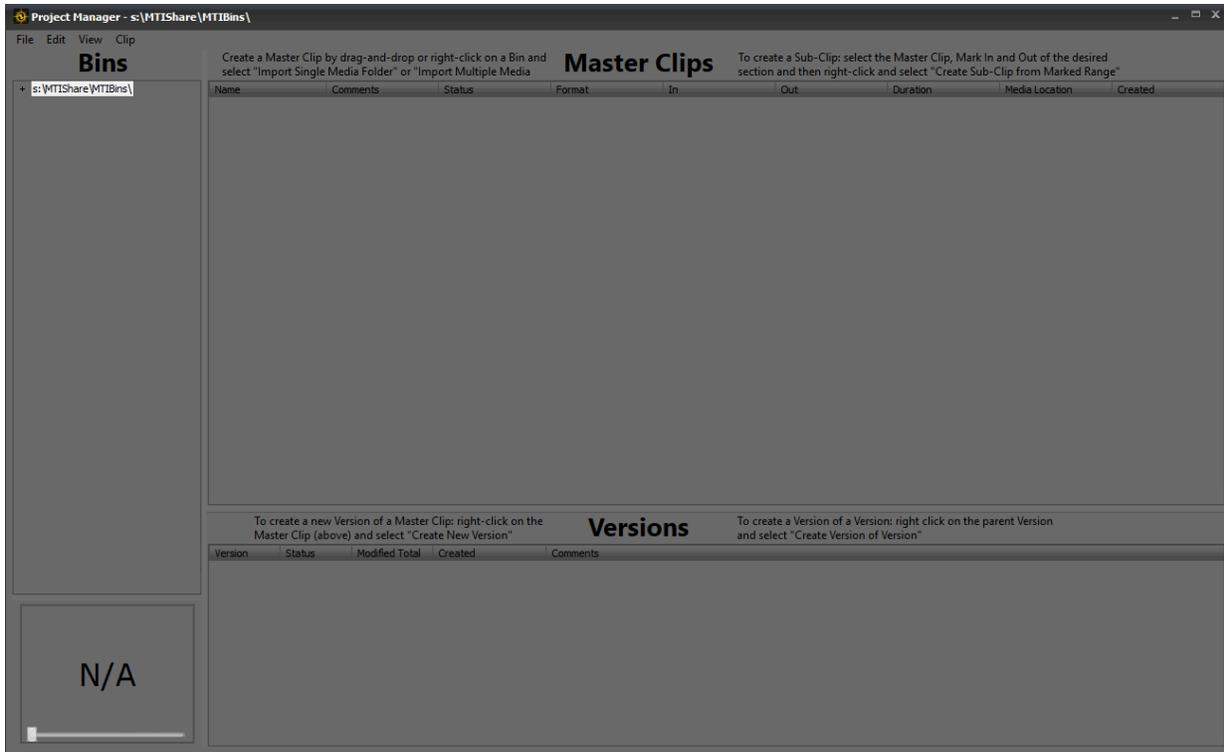
1. For Windows 10 or 11, find "This PC".
2. Right-click on "My Computer" or "This PC".
3. Click on the menu item "Properties". You should see a dialog that says "View basic information about your computer".
4. Click on "Advanced system settings" in the left pane of the window. The "System Properties" dialog should pop up, with the "Advanced" tab selected.
5. Click the "Environment Variables" button. The "Environment Variables" dialog should pop up.
6. Look in the upper scrolling list of variable definitions under the heading "User variables for <computername>". If you find a variable named CPMP_SHARED_DIR, select it and click the "Delete" button under that list.
7. Look in the lower scrolling list of variable definitions under the heading "System Variables", and...
 - a. If you find CPMP_SHARED_DIR, select it and click the "Edit" button.
 - b. or, if the list does not contain CPMP_SHARED_DIR, click the "New" button, then in the popup enter CPMP_SHARED_DIR in the "Variable name" field.
8. Enter R:\MTIShare\ in the "Variable value" field. Click the "OK" button. Close all the dialogs.

Creating a Project

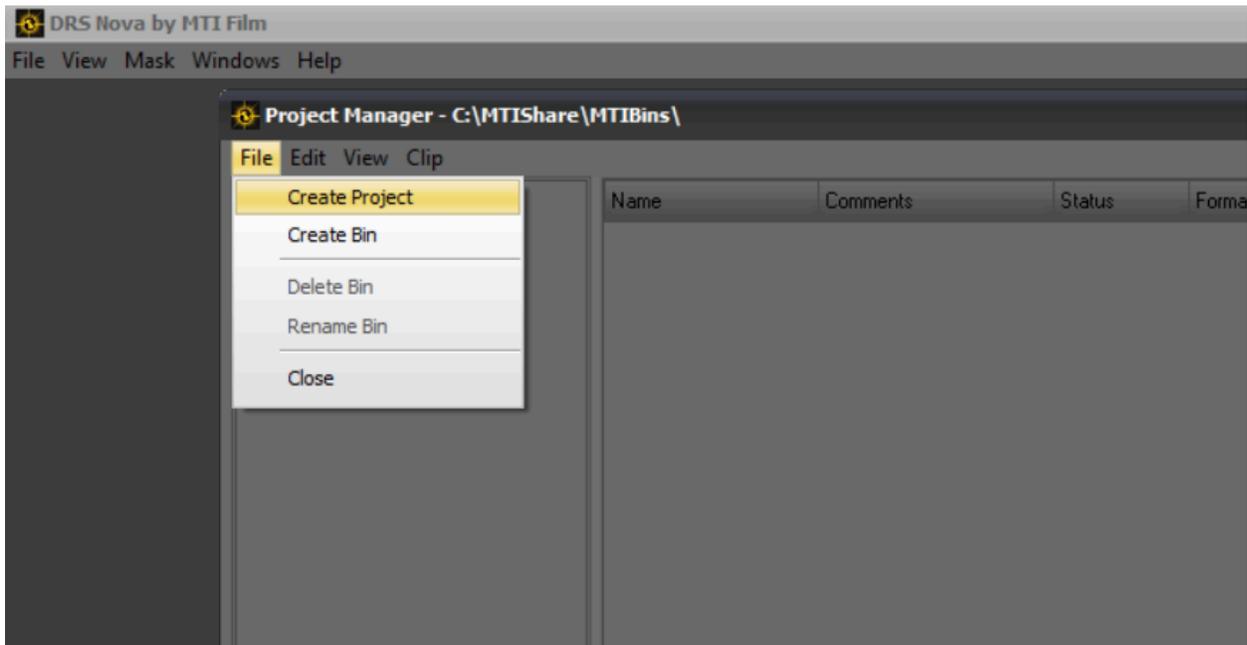
1. Click the File menu on the Main Screen and choose Open Project Manager or press Ctrl+O



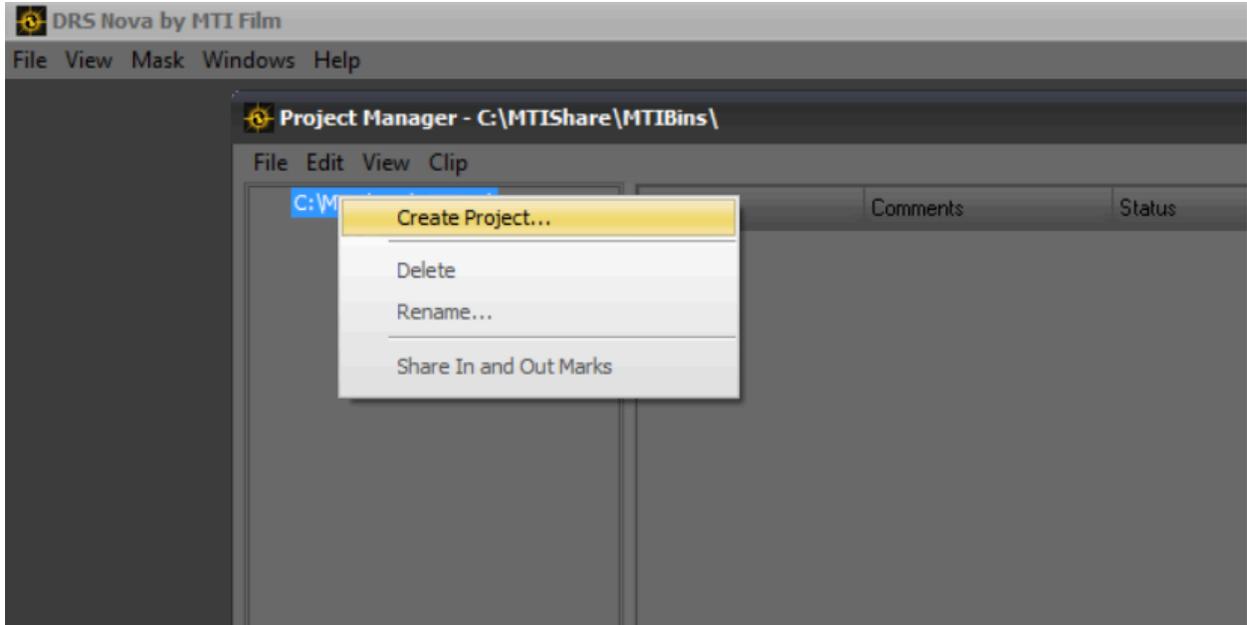
The Project Manager will open.



2. On the Project Manager, click the File menu and select Create Project



Or right-click on the root directory and select Create Project.



The project dialog window will open for input.

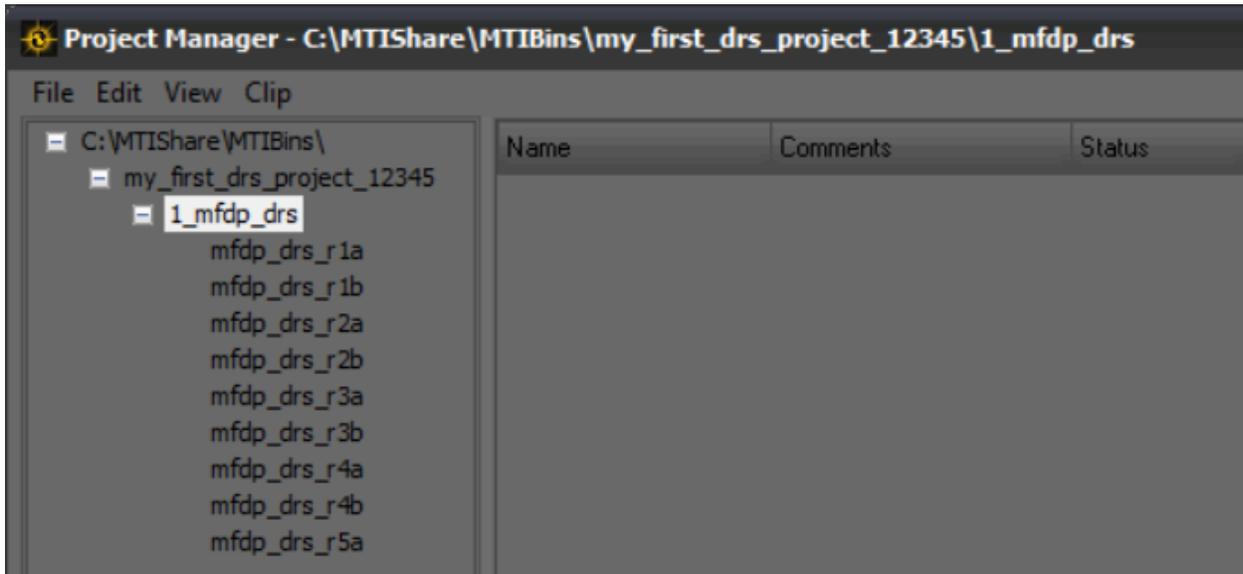
The screenshot shows a 'Create Project' dialog box with the following fields and options:

- Project Name: My First DRS Project
- Nickname: mfdp
- Job #: 12345
- # Reels: 5
- Checkboxes: A/B, Combined, Last reel A only
- Job Folders: dewarp, masks, pdis, reports, cut_lists, stabilize
- Media Loc.: C:\
- Media Folders: DRS, User

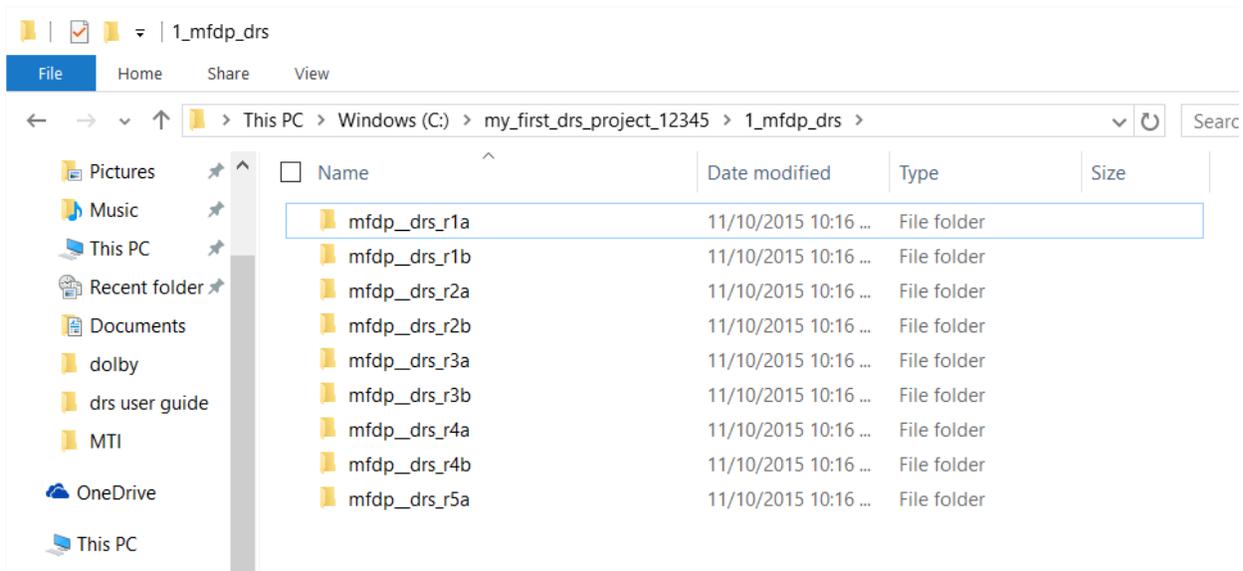
3. Fill as follows: (*Other than Project Name, no additional information is required*)
 - a. Project Name - Enter the full name of the project
 - b. Nickname - create an acronym that will serve as a prefix for folder naming
 - c. Job # - If your company uses job numbers, enter it here. It will be appended to your Nickname.
 - d. # Reels - If applicable, enter the number of reels for your project. Some films consist of two parts referred to as either the A or B part. For example, Reel 1 might consist of parts A and B, which might be combined into a single roll or two separate rolls. If the reels are combined, enable the 'Combined' checkbox, and if the last reel consists of part A only, enable the 'Last reel A only' checkbox.
 - e. Job Folders - DRS™ Nova generates a variety of metadata that can be automatically saved into folders found within the MTIShare\MTIBins folder. Enable those checkboxes for which you wish folders to be created (all are enabled by default). When tool operations pertaining to those folders are processed, the metadata will either be automatically saved or directed to the folder when the 'Save' function is invoked. It is recommended that all checkboxes are enabled.
 - f. Media Loc. - Based upon the directory entered in this field, the Project Manager will automatically create 'Media Folders' into which you can place your media prior to creating clips.
 - g. Media Folders - Two types of media folders can be automatically created:
 - i. DRS - a folder named "DRS" will be created for every reel indicated in the '# Reels' field. For example: mfdp_drs_r1a
 - ii. User - a folder using the user defined name will be created for every reel indicated in the '# Reels' field. For example: mfdp_orig_r1a

4. After all project information is entered, click Save.

Based upon the above input, these 'Bins' will appear in the Project Manager



The following folders will appear in the directory entered in the Media Location:



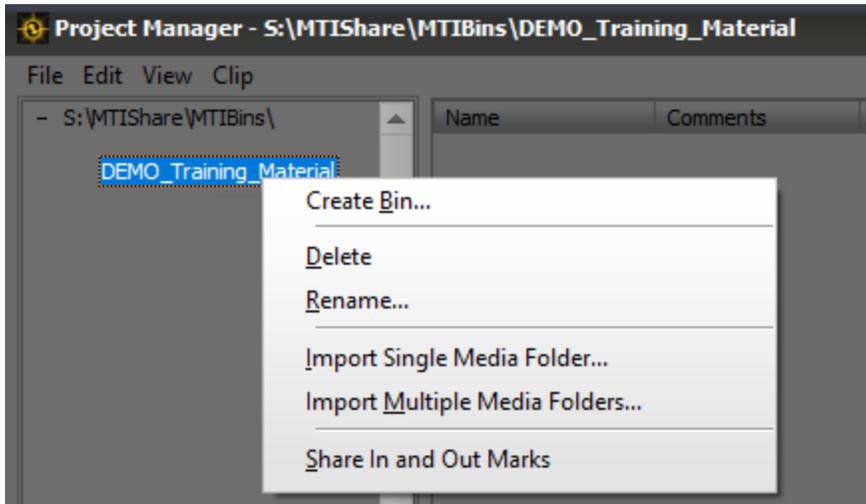
You may now move your media into their respective media folders.

Note: *If you prefer to create your own folder structure, you can simply ignore as many of the fields as you like with the exception of the Project Name. Or, if you only want to use the Project Manager to create bins for reels, ignore the Media Loc(ation) and Media Folders fields.*

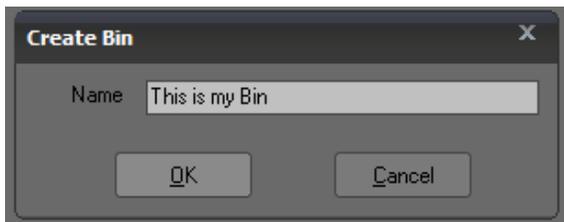
Creating Bins

Once the project is created, you can create “Bins” where Master Clips media are stored. It is possible to create clips at the project level, however, depending on the extent of clips required, it may be useful to create Bins for organizational purposes.

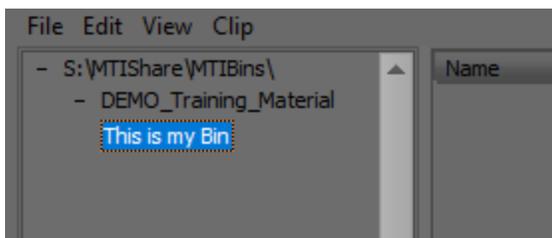
1. Right-click on the project name and select Create Bin...



2. A dialog box will appear. Input the name of the bin and click OK or press Enter.



3. The name of the bin will appear below the project name.



You can also create “Sub-Bins” by right-clicking on the parent bin and selecting Create Bin...

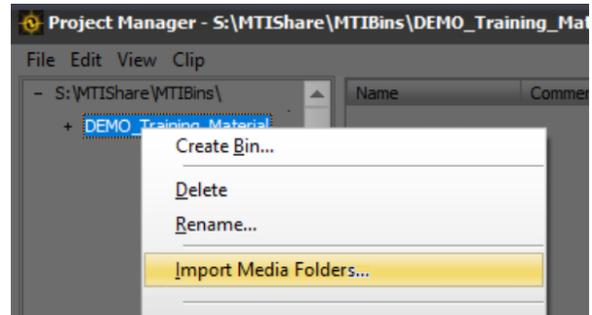
Importing Files to Create Master Clips

There are two methods of importing files that are designed to accommodate different types of folder structures or requirements: Both methods use the same import process.

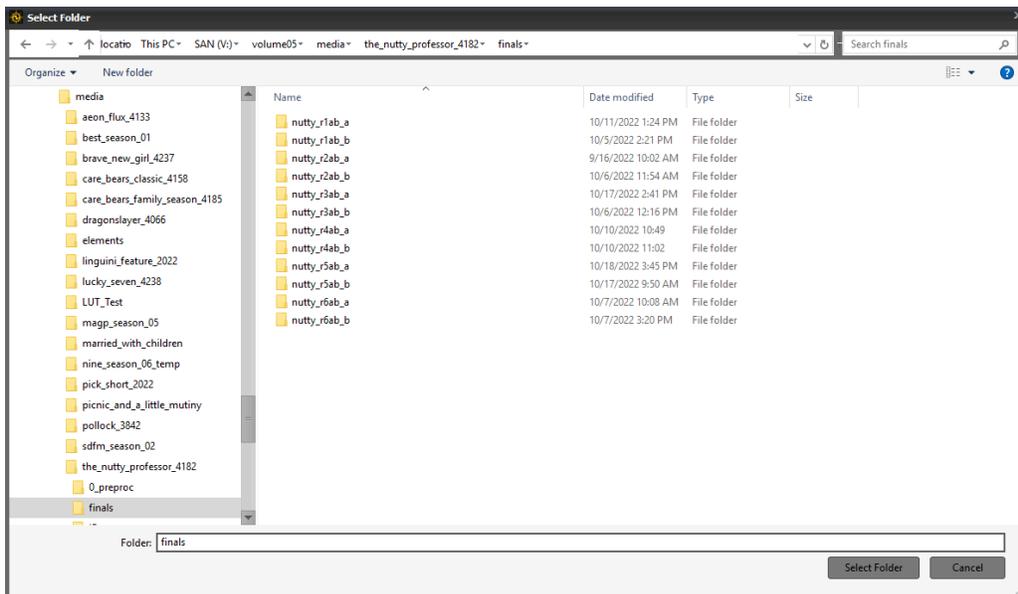
1. Where files contained in one or more folders are numbered sequentially from start to finish with no breaks.
2. Where breaks occur in the numbering sequence.

Importing the Clip(s)

1. In the Project Manager, right-click on a Bin and select “Import Media Folders”.



A Windows File Explorer will open.



2. Navigate to the media folder that contains the folder(s) and files for the clip(s).
 - a. To select a single folder, double click it or select it and then click the “Select Folder” button at the bottom of the window.
 - i. If you select a folder that contains multiple folders, DRS™Nova will drill down into each folder in the directory path and create clips with frame ranges appended to the file name.

- b. To select multiple folders non-sequentially, CTRL+click on the individual folders and then click the “Select Folder(s)” button.
- c. To select multiple folders that are in sequence, click on the first folder, SHIFT+click on the last folder, and then click the “Select Folder” button.

Clips will be created in the bin with their frame range appended to the clip names.

For folders that contain files with no break in their numbering sequence, a single clip will be created for the whole sequence.

For Example:

A folder contains files with no breaks in the numbering sequence starting with “myproject_r01.086208.dpx” and ending with “myproject_r01.0116078.dpx”.
The clip will be named “myproject_r01_086208_0116078”

For folders that have breaks in the numbering sequence, a clip will be created for each sequence and appended with their frame range.

For example:

A folder contains files that has 3 breaks in the numbering sequence as follows:
Clip 1 will be named “myproject_r01_086400_086800”
Clip 2 will be named “myproject_r01_087000_088000”
Clip 3 will be named “myproject_r01_092000_095000”

For folders that contain files duplicated in other folders with the same frame range, an _# will be added to the clip name at the end of the frame range.

For example:

Folders 1 and 2 both have files that are named identically starting with “myproject_r01.086208.dpx” and ending with “myproject_r01.0116078.dpx”.
The clip derived from Folder 1 will be named “myproject_r01_086208_0116078”
The clip derived from Folder 2 will be named “myproject_r01_086208_0116078_1”

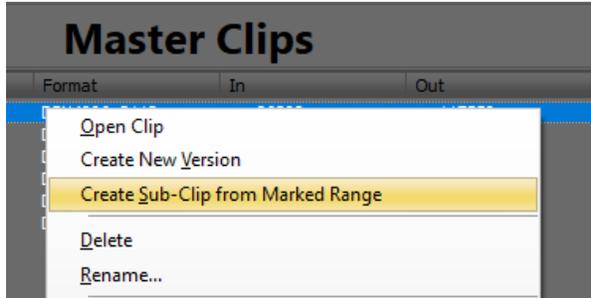
Note: If a clip has been previously created and is encountered during the clip creation process, it will be ignored.

You can also **Drag and Drop** a folder(s) from a Windows File Explorer into the Project Manager Master Clips area. Nova will automatically create clips as per above.

Note: Prior to dragging and dropping a folder into the Master Clips area, make sure to select its corresponding Bin first.

Creating a Sub-Clip of an Existing Master Clip

There are times when you may want to divide a Master Clip into Sub-Clips in order to assign different frame ranges to each artist.



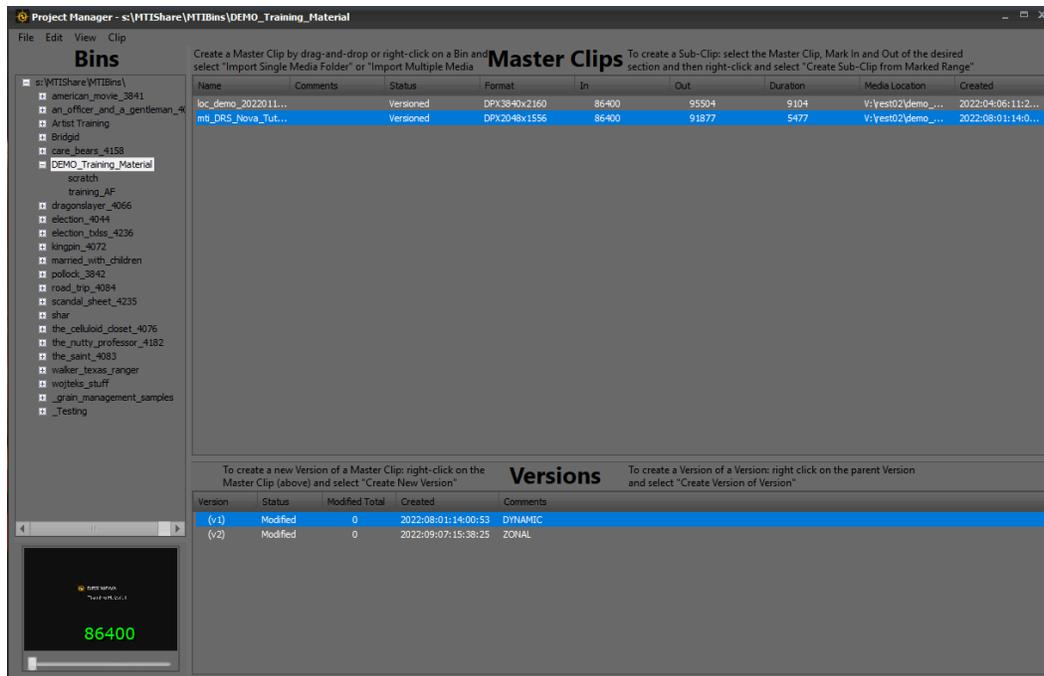
1. Select the clip and Mark an In to Out range
2. In the Project Manager - Master Clips, right-click on the clip and select: "Create Sub-Clip from Marked Range"

The Sub-Clip will be created and placed in the bin with the file range appended to its file name.

Moving Clips from Bin to Bin

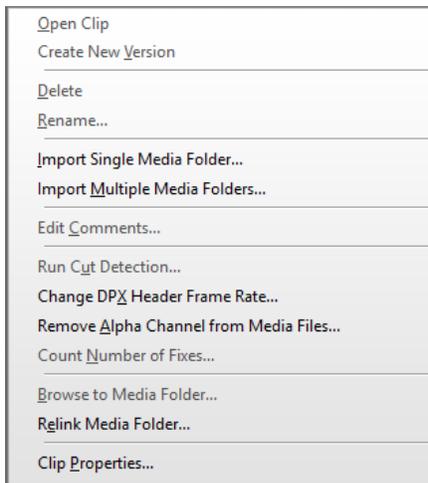
After a clip has been created, it is possible to move it to another Bin. Clips that are currently loaded in the player cannot be moved so first load a clip that does not have to be moved.

1. Single left-click and hold down the mouse button on the clip to be moved. It will be highlighted in blue and any versions that are associated with the clip will be visible in the Versions Bin below.



2. Drag and drop the clip into the new Bin location. The clip and its associated versions will be moved to the new location.

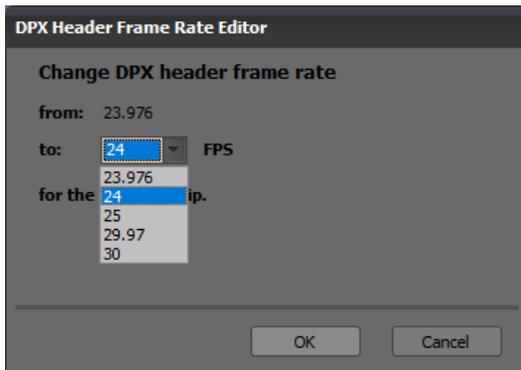
The Master Clips Context Menu



Right-clicking on a clip or any blank area of the Master Clips opens the context menu. Most functions are obvious by their name but the following explains some in more detail.

Edit Comments...

To add or edit a comment, use the Edit Comments command. Highlighting multiple clips allows for entering the same comment into all the highlighted clips.



Change DPX Header Frame Rate...

If the frame rate of the dpx files needs to be changed, clicking this function will bring up a dialog in which you can choose a new frame rate that alters the DPX headers information.

Note: If a Master Clip has versions the frame rate cannot be changed.

Remove Alpha Channel from Media Files...

To remove the Alpha from a Master clip's DPX sequence of files use the Remove Alpha Channel function. You can highlight multiple Master clips and DRS™Nova will remove the Alpha from all the files for the highlighted clips in turn.

Note: If a Master Clip has versions the Alpha Channel cannot be removed.

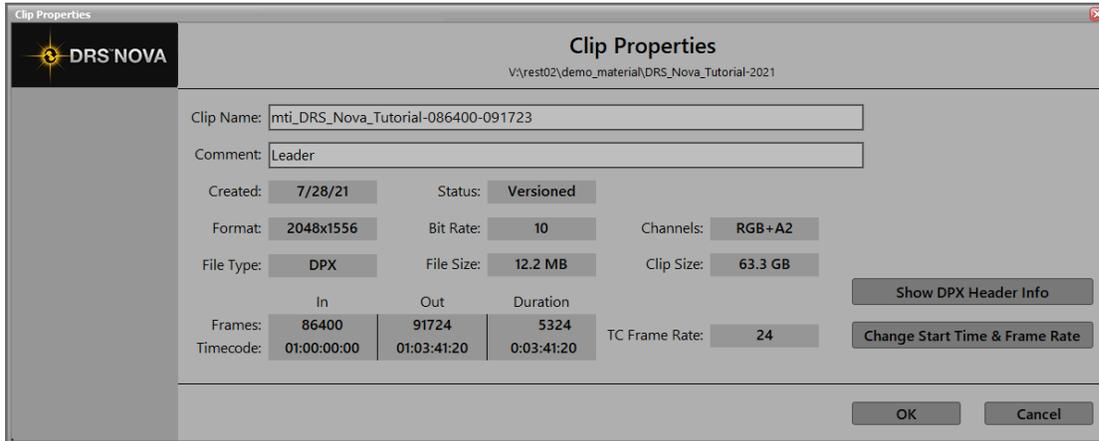
Relink Media Folder...

If a folder(s) of files has moved from its original location, this function allows for relinking the files used to create the original clip. When the dialog box opens, navigate to the new location and choose the top level folder that contains folders/files for Nova to drill down into and relink.

Note: The name of the files must be the same as the original ones.

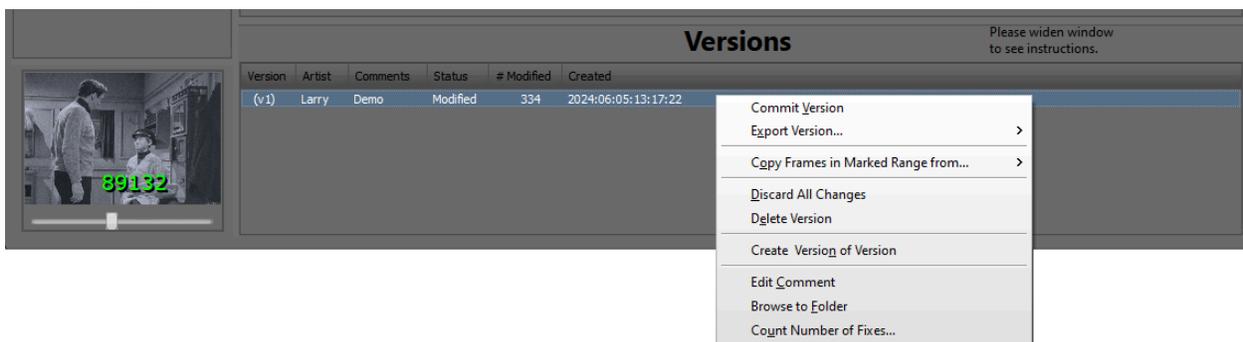
Clip Properties...

To view all metadata related to a clip, click Clip Properties.... You can edit the name of the clip and enter or edit a comment, and change the start timecode and frame rate. Changing the Start Timecode and Frame Rate is virtual and does not alter the clip's native settings.



The Version Context Menu

Right-clicking on a version will open the Version Context Menu. For the most part, these functions will be explained in more detail in subsequent sections but it is worth noting the distinction between “Commit Version” and “Discard All Changes” found in this menu and “Commit Changes in Marked Range of Version Clip” and “Discard Changes in Marked Range of Version Clip” found in the File menu of the Main Screen.



In the Version Context Menu, “Commit Version” copies all frames created in the version and overwrites the frames in its parent. Once the copy is completed, the version will be removed from the Version Bin view and tagged “Committed” to the directory folder that contained it.

The “Commit Changes in Marked Range of Version Clip” found in the Main Screen File Menu only copies and overwrites those frames in the marked range of the version.

Similarly, in the Version Context Menu, “Discard All Changes” will delete all frames found in the version while “Discard Changes in Marked Range of Version Clip” found in the Main Screen File Menu only deletes the frames in the marked range of the version.

Count Number of Fixes...

This function will report back the number of fixes recorded in the History folder (as explained later). This will require patience depending on the number of fixes made to the clip.

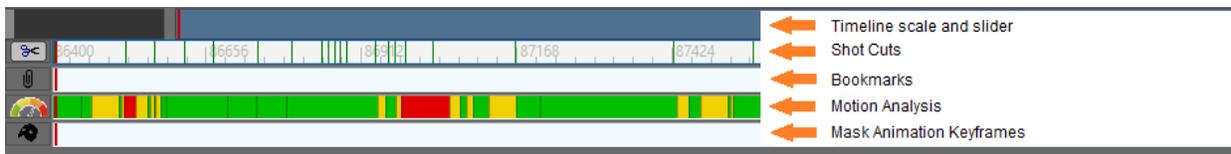
Timelines

In Regular or Full Screen display modes, DRS™NOVA will display a timeline with a red cursor indicating the current frame.

You can optionally show or hide the timelines:

Timeline	Shortcut Key
Shot Cuts	O
Bookmarks	P
Motion Analysis	[
Mask Animation Keyframes]

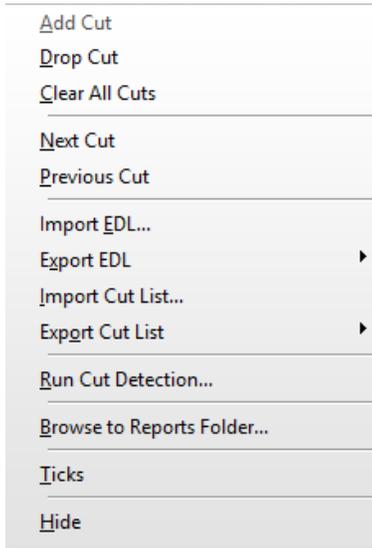
To hide a timeline press SHIFT+ the key command.



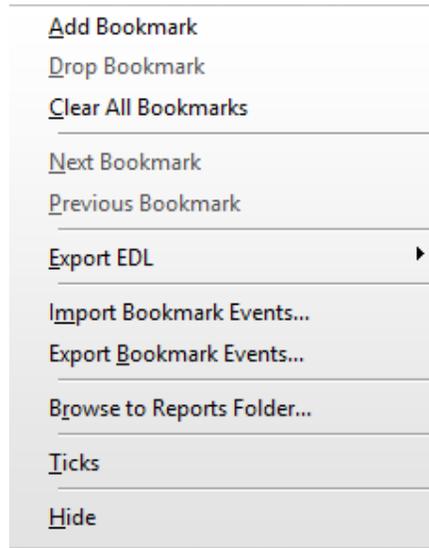
Context Menus of the Timelines

For each timeline, you can right-click on them and display the context menu associated with the timeline and the various available options:

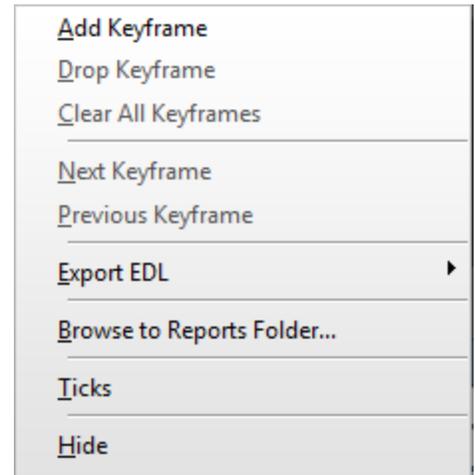
CUTS



BOOKMARKS



KEYFRAMES



Sizing the Timeline

The timeline is sized by clicking and sliding the “Thumb”. Slide to the right to zoom in and to the left to zoom out. The Timeline Scale (blue bar) indicates the portion of the timeline being viewed based upon the applied zoom. To move the Timeline Scale when zoomed in, click on any portion of the blue bar and slide it left or right until it reaches the desired view position.

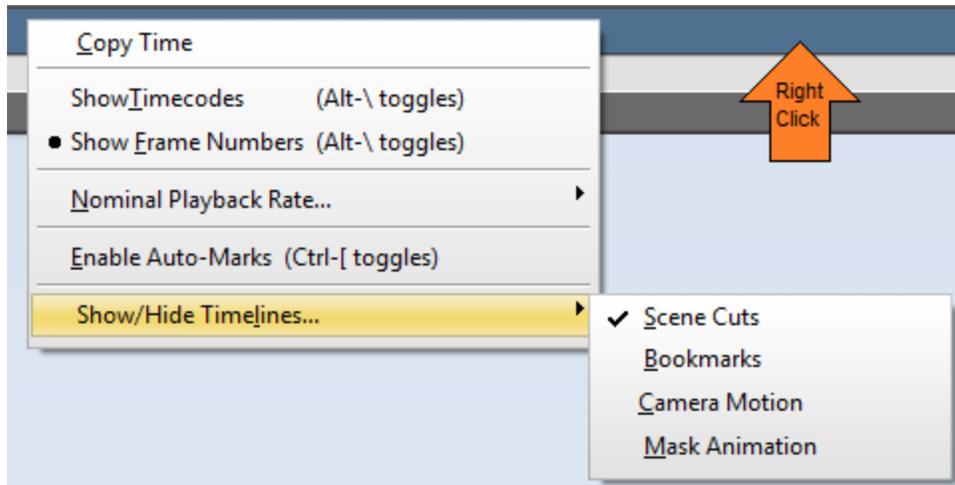


Preparing a clip for work

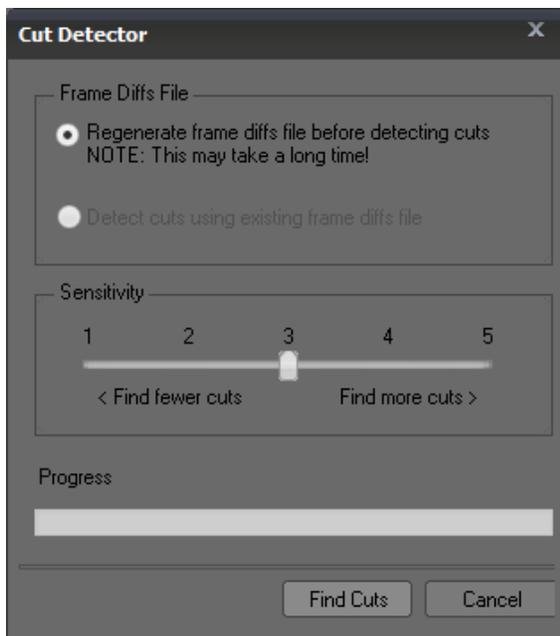
Run Cut Detection

Before you begin working on a clip it is best to detect the shot cuts embedded in the content. To do this:

1. Expose the Cuts timeline by right-clicking on the Blue Timeline Viewing Area slider and select “Scene Cuts” from the Show/Hide Timelines...extended menu or press the O key.



2. Right-click on the Cuts timeline or right-click on the clip in the Project Manager/Master Clips and select “Run Cut Detection”
3. A dialog window will pop up. Use the default settings and click “Find Cuts”
4. After the Cut Detection completes, right-click on the Cuts timeline and choose Export Cut List to the suggested location or choose a new one.



5. If you wish to add a cut, press the N key or right-click on the Cuts timeline and select Add Cut from the context menu.
6. If you want to delete a cut, press CTRL+N or right-click on the Cuts timeline and select Drop Cut from the context menu.

Note:

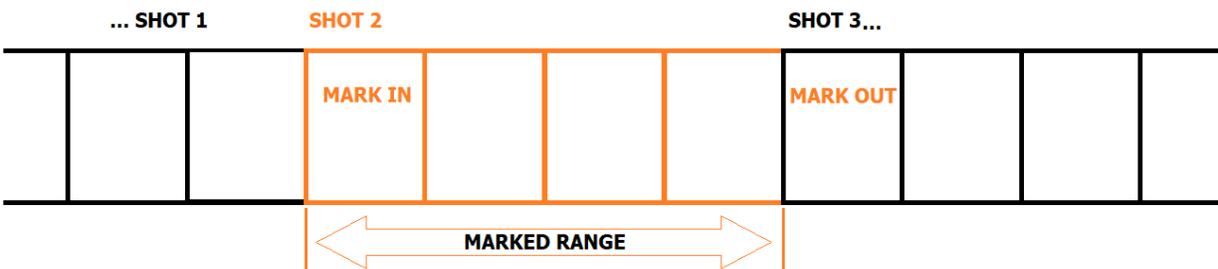
Generally, use the defaults and click the “Find Cuts” button. The cut detection will begin and its progress will be reflected in the progress bar at the bottom of the window. Once completed click the “Close” button and the detected cuts will appear.

Marking a Shot In to Out

All tools in DRS™Nova depend on cuts being clearly defined for each shot in order for the algorithms to perform a proper analysis. After cut detection has been run and the cuts are vetted for false positives and negatives, DRS™Nova uses a method of marking a shot called **“Exclusive Marks”**.

Simply stated, this method requires that the first frame of the current shot be marked IN (E key) and the first frame of the succeeding shot be marked OUT (R key).

Graphically, it would look like this:



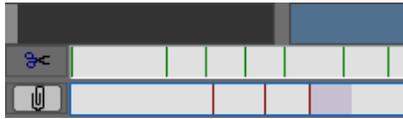
Cut Navigation Tips

After cuts have been detected and vetted:

1. The H key automatically marks the current shot from IN to OUT.
2. The E key marks IN
3. SHIFT+E goes to the IN mark
4. CTRL+E clears the IN mark
5. The R key marks OUT
6. SHIFT+R goes to the OUT mark
7. CTRL+R clears the OUT mark
8. SHIFT+F key or the K key goes to the Next cut
9. SHIFT+S key or the J key goes to the Previous cut

When timelines other than the Cuts timeline are selected, SHIFT+F and SHIFT+S are used to navigate their respective locator points. For example, if the Bookmark timeline is selected, those commands will navigate to the bookmarks present on the timeline, therefore, use the K and J keys to navigate the cuts when other timelines are selected.

Bookmark Timeline and Bookmark Event Viewer



The Bookmark Timeline is used to note issues that require attention. The example shows two single frame events and an event with a range of frames shaded in lavender.

To show and focus the Bookmark Timeline, right-click on the blue Timeline Scale bar and select Show/Hide Timelines. From the extended menu, select Bookmarks. Or, press the P key to enable the Bookmark timeline.

There are **two** methods of adding a “Bookmark” to a frame position to note an issue:

Timeline Only Bookmarks

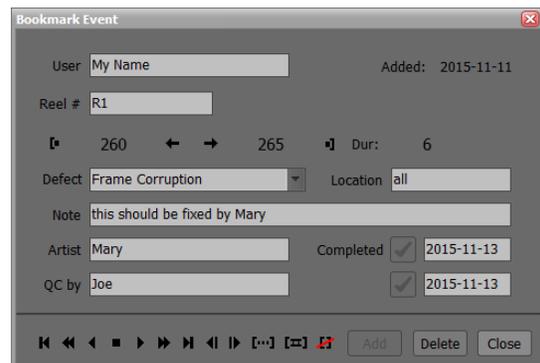
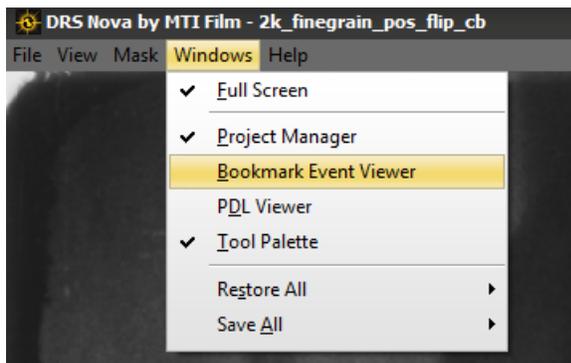
This method does not require the Bookmark Event Viewer to be open. Pressing the M key enters a Bookmark on the Bookmark timeline whether the timeline is shown or not. However, it is recommended that you show and focus the Bookmark timeline in order to navigate the Bookmarks. In this method, the Bookmark only has a one frame duration with no corresponding information or comment.

Timeline Only Shortcut Keys

Show and focus Bookmark Timeline	P	Press SHIFT+P to Hide the Bookmark Timeline
Add a single frame Bookmark	M	
Go to previous Bookmark	SHIFT+S	The Bookmark timeline must be focused for these functions
Go to next Bookmark	SHIFT+F	
Delete a Bookmark	CTRL+M	Cursor must be located on Bookmark

Bookmark Event Viewer

If you wish to bookmark a range of frames, add a comment, and export a report as a .csv file, the Bookmark Event Viewer provides that ability. Click ‘Windows’ in the Main Screen menu and select Bookmark Event Viewer from the extended menu or press Ctrl+Shift+M. The Bookmark Event Viewer window will pop up and the Bookmark timeline will be automatically focused.



Bookmarking a Frame or Range of Frames

With the Bookmark timeline open, pressing the M key adds a Bookmark Event and marks the first frame. If the issue is one frame long, M adds the bookmark on the current frame. After adding the Bookmark, if you wish to note a range of frames within a shot, navigate to the out point and press the R key (mark out).

To mark an entire shot, press SHIFT+M or click the Mark Shot button . This will add an event and mark the whole range of frames in the shot. After you add a Bookmark Event, the cursor will be placed in the 'User' field and today's date will be recorded in the 'Added' field.

Once you've entered your user name and the reel number, those fields will persist for the remainder of the session. Use the Tab key to move forward through the fields or SHIFT+Tab to move back. Press the enter key to complete the dialog and return focus to the main Player Window. Adding a new event transfers focus back to the Event Viewer.

To view comments after they've been added to the timeline, with the Bookmark timeline selected, navigate to their start frame by pressing SHIFT+S to go back or SHIFT+F to go forward.

Modifying Marks of a Bookmark Event

To modify the In or Out points of an event, the Bookmark Event Viewer must be open and the timeline selected. Navigate to the first frame of the Bookmark using the SHIFT+S or Shift+F functions so that the lavender shaded area of the event is visible, which indicates that it is focused. To re-mark the In or Out point, move the cursor to the desired location and press E for the In point or R for the Out position. When **other timelines are selected**, press ALT+E or ALT+R respectively. Alternatively, click the Mark In  or Mark Out  buttons on the Event Viewer. Modifying the In point invokes a message asking whether the event should move to the new position. Respond: Yes.

Deleting a Bookmark Event

To Delete a Bookmark Event, navigate to the event by pressing SHIFT+S or SHIFT+F, and then press CTRL+M.

Exporting a Bookmark Report

For either of the two Bookmark methods you can export the bookmarks to a .csv file. If during setup of the project the Reports folder checkbox was enabled, it will be saved to that folder location. To export the events, right-click on the Bookmark timeline and choose "Export Bookmark Events..." from the context menu. You can open this file in any Excel type program.

Importing a Bookmark Report

If desired, you can import the .csv file into clips that share some or all of the same frame ranges, for example SubClips. To import the report, right-click on the Bookmark timeline and choose "Import Bookmark Events..." from the context menu.

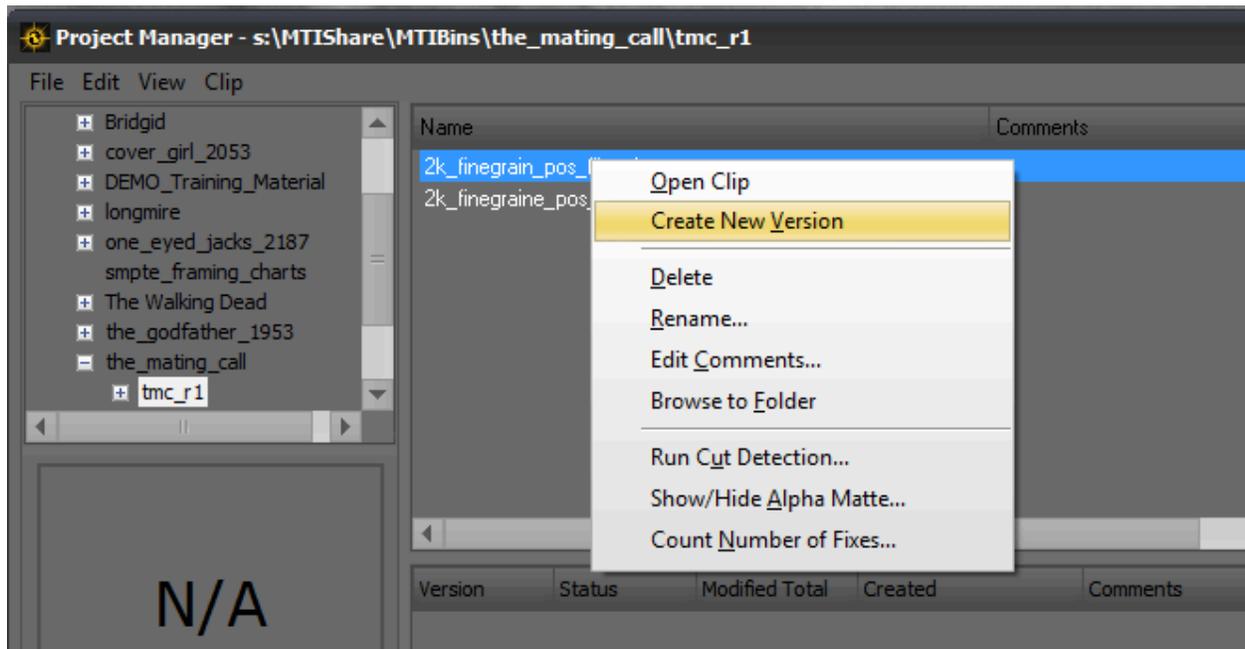
Bookmark Event Viewer Shortcut Keys

Show / Hide Bookmark Event Viewer	CTRL+SHIFT+M	When hiding, the timeline will remain
Add a Bookmark Event and Mark In	M	Or click the Add button
Re-Mark In of current Bookmark Event	E or ALT+E	Or click the Mark In button 
Mark Out of current Bookmark Event	R or ALT+R	Or click the Mark Out button
Bookmark the Shot	SHIFT+M	Or click the Bookmark current shot button 
Go to current Event Mark In	CTRL+SHIFT+E	
Go to current Event Mark Out	CTRL+SHIFT+R	
Go to Previous Bookmark	SHIFT+S	The Bookmark timeline must be focused for these functions
Go to Next Bookmark	SHIFT+F	
Delete a Bookmark	CTRL+M	Cursor must be located on Bookmark

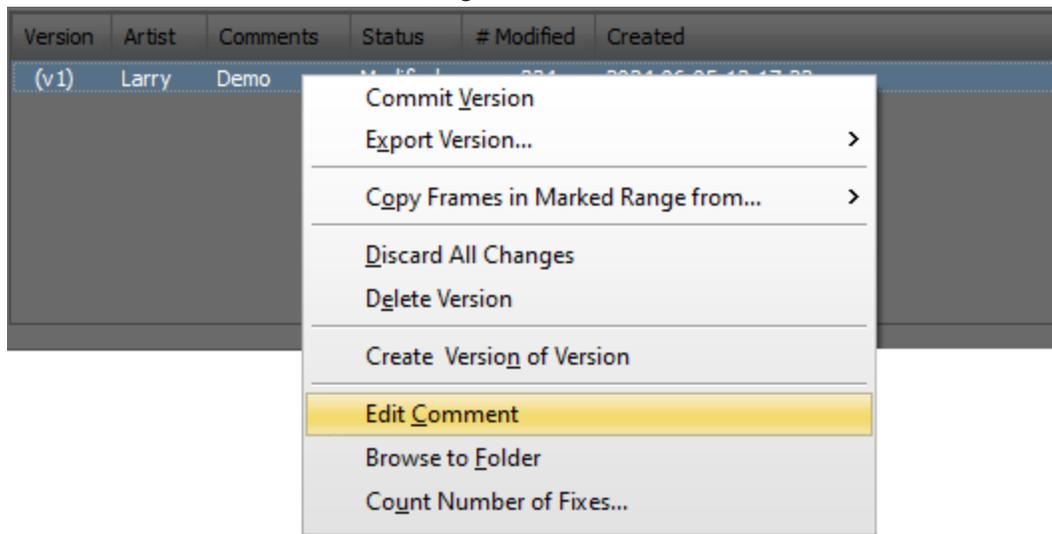
Creating Versions

When doing full frame operations such as stabilization, dewarp, flicker, grain, etc. you may want to experiment with different values. DRS™NOVA provides the facility to create a version of the parent clip that is non-destructive to it. You can create as many versions as required.

To create a version, right-click on the master clip and select Create New Version. The version will be numbered indicating the version number, for example (v1).



To add a comment to the version, right-click and select Edit Comment from the context menu.



Note: When a version exists for a parent clip, changes cannot be made to the parent.

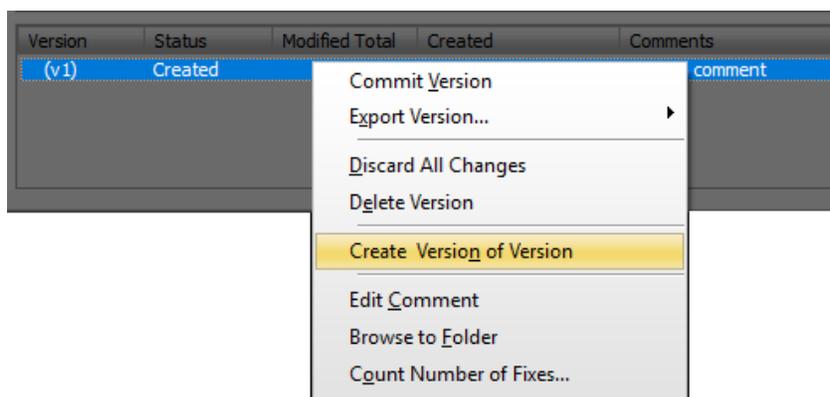
Once you've completed work on the version, you can "commit" the version back to the master clip, which will replace the master clip's frames with those modified in the version. You can also export the version as described later.

Note: Committing a version copies and replaces the frames of the parent so having a backup copy of the original parent frames is recommended. Alternatively, you can commit all versions of versions and then stop at the main version and export.

Creating a Version of a Version

In order to experiment with different approaches to solving a particular problem without modifying work already done in a version, DRS™NOVA provides the facility to create a version of a version. You can create as many versions of versions as required. You can even create a version of a version of a version, and so on.

To create a version of a version, right-click on the version and select Create Version of Version from the context menu.



A new version will be created with a v#.# extension, for example (v1.1). If you create a version of a version of a version it will be numbered v#.#.#, for example (v1.1.1), and so on.

Version	Status	Modified Total	Created	Comments
(v1)	Versioned	0	2015:11:13:10:19:51	
(v1.1)	Versioned	0	2015:11:13:11:00:14	
(v1.1.1)	Created	0	2015:11:13:11:22:20	

Discarding Changes in a Version or Version of Version

There are two ways to discard changes in a version.

1. Discard all the changes - right-click on the version and select Discard Changes.
2. Discard changes in a marked range - In the File menu located in the Main Screen, select “Discard Changes in Marked Range of Version Clip” or press Shift+Delete.

Committing Versions

There are two ways to commit versions.

1. Commit all the changes - right-click on the version and select “Commit Version”.
2. Commit changes in a marked range - In the File menu located in the Main Screen, select “Commit Changes in Marked Range of Version Clip”.

When committing versions bear in mind that the last version committed will be the “hero” frames. For versions of versions, carefully commit the versions in proper order. For example, if you have 2 versions of a version, v1.1 and v1.1.1, and you want to commit all of them, you must commit them one at a time from last to first. If you commit V1.1 before V1.1.1 then frames contained in V1.1.1 will be “orphaned” and the version will disappear from the list.

Deleting Versions

To delete a version, right-click on it and select “Delete Version” from the context menu. Deleting a version will also delete any corresponding versions of versions.

Exporting Versions

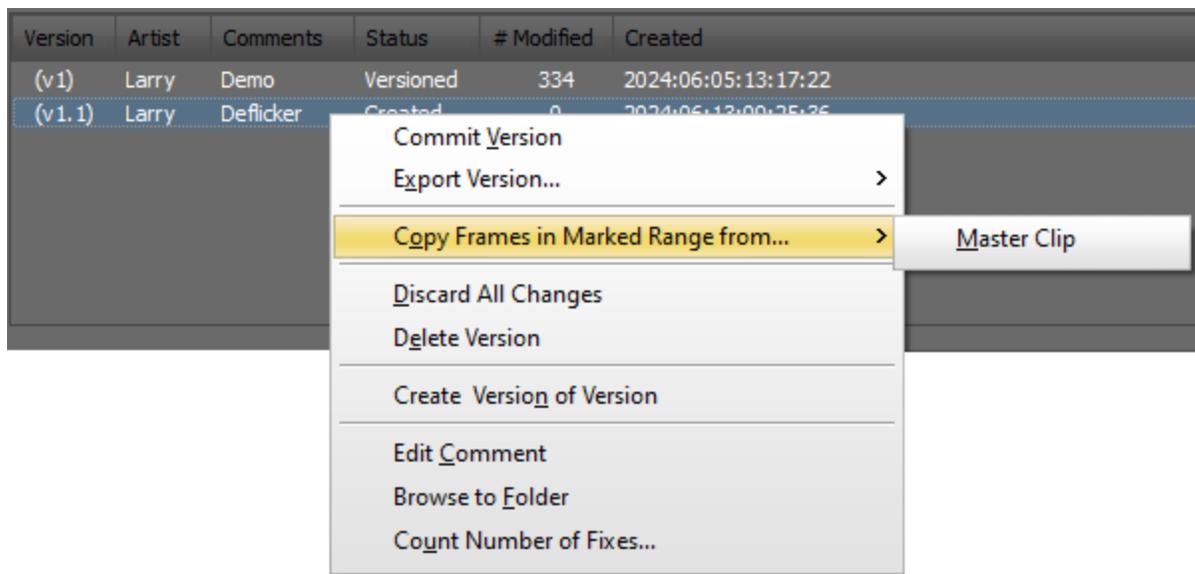
DRS™NOVA provides the option to export a version. The exported frames will include modified and unmodified frames to the same file format as the master clip. To export a version, right-click on it and select “Export Version” then choose “Export Full Clip” or “Export Marked Range” from the extended context menu. Alternatively, you can also use the File menu in the Main Screen to do the same.

The version will be exported to a folder named the same as the original version. It will be contained in an “EXPORTS” folder on the same directory level as the original version.

Copying Frames in Marked Ranges

The need to use frames from either a Master clip or a version in another version can arise from time to time. For example, version 1 did a stabilization pass and version 1.1 is created to do a deflicker pass, however, the stabilization done of a shot in version 1 has an error and needs to be redone. Since it is not allowed to go back to the parent of version 1.1, you can copy frames from the Master to it and redo the stabilization prior to the deflicker. When version 1.1 is committed to version 1, the new stabilization/deflicker frames will overwrite the frames of version 1.

1. Right click on the current version.
2. Select “Copy Frames in Marked Range from...”



mtai

3. From the extended menu, choose from the available clips as the source
4. A dialog window will open asking to approve the copy. Respond 'Yes'.

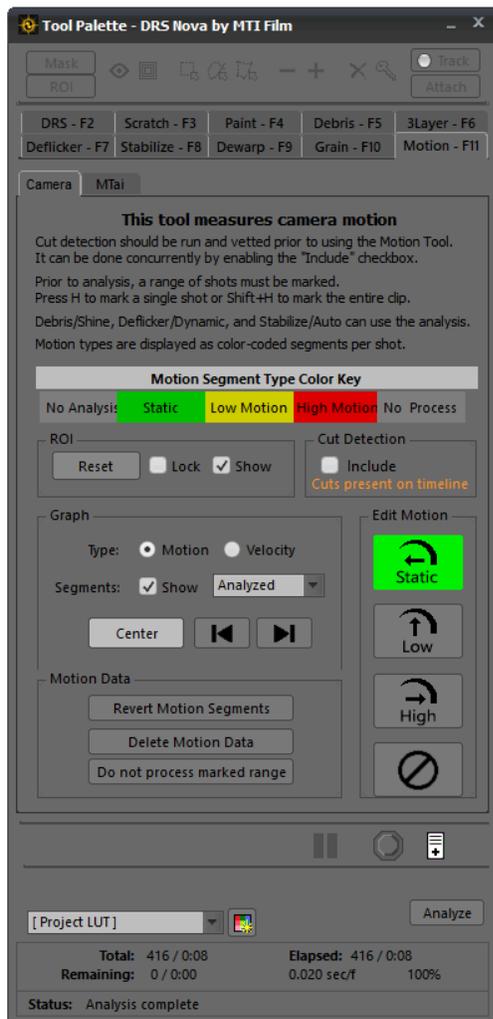
Using the Motion Tools

There are two Subtabs found in the Motion Tool, Camera Motion and MTai Frame Generation. each serving a different purpose.

Camera Motion

The Camera Motion Tool provides an algorithm that measures degrees of camera motion as follows:

1. Static
2. Low Motion
3. High Motion

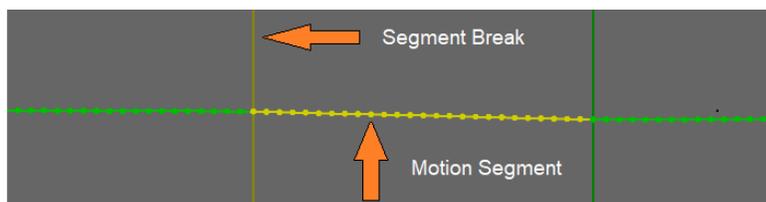


The Camera Motion tool is used to analyze a clip that has been cut detected, splitting each shot into “Motion Segments” divided by “Segment Breaks”

The Debris/Shine, Deflicker/Zonal, and Stabilize/Auto tools are able to use these motion segments to determine the settings to be applied to them.

The objective is to allow tools that are subject to motion artifacts to minimize the risk by either applying conservative settings or bypassing the tool on motion segments as determined by the user. For example, in the Stabilization Auto Mode tool, the user can instruct the tool to not process high motion segments within a shot or for all shots in the clip thereby reducing the potential for unwanted artifacts.

If **Cut Detection** has not been run previously, it is possible to include it during the motion analysis. To include cut detection during analysis, enable the “Include” checkbox in the Cut Detection box. After running the analysis, it is important to vet the cuts.



After the analysis is complete, the graph will show Segment Breaks preceding the Motion Segments.

Initiating the Analysis

1. Mark In and Out on the clip to begin the analysis of the marked range. It can be the whole clip (Shift+H), a single shot (H), or a marked range.
2. Click the Analyze button or press Ctrl+G

Moving Between Motion Segments

After the analysis is complete:

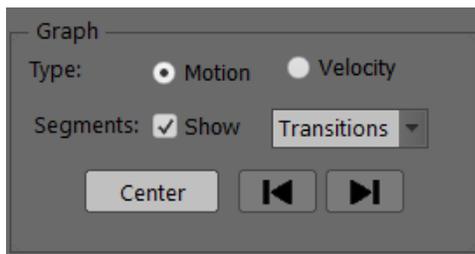
1. To move to the next motion segment in the current shot - Press Ctrl+Shift+F or click "Go To Next Motion Segment" 
2. To move to the previous motion segment in the current shot - Press Ctrl+Shift+S or click "Go To Previous Motion Segment" 

Changing a Motion Segment

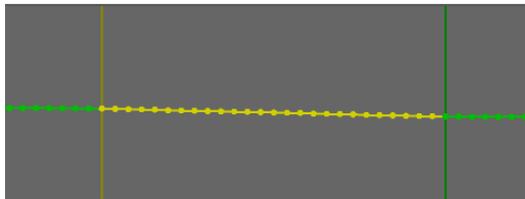
Once completed, review all the motion segments. If desired, with the cursor resting on a motion segment, change it by clicking the desired motion type button in the Edit Motion box.

In addition to being able to change a segment's motion type, you can determine that it will not be processed during rendering by clicking the "No Process" button while resting on the segment.

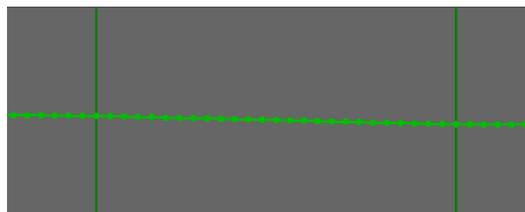
Changing the Segments Display



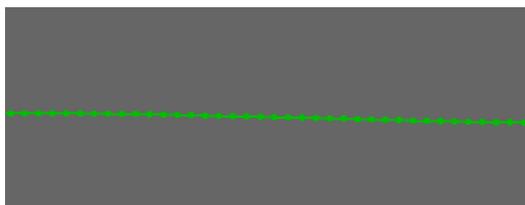
There are three modes of display for the Segment Breaks:



1. **Analyzed**
Shows the segment breaks as they were originally analyzed. In this example - Yellow



2. **Modified**
Shows the segment break matching the modified motion segment. In this example - Green.



3. **Transitions**
Eliminates segment breaks between segments when one has been modified to match the adjoining segment(s).

Camera Motion Tool Shortcut Keys

Function	Keys	Note
Select Static	1	
Select Low	2	
Select High	3	
Select No Process	4	
Toggle Graph Type	5	
Toggle Show Segment Breaks on Graph	6	
Toggle Show ROI	CTRL+T	
Lock ROI	CTRL+SHIFT+T	
Include Cut Detection	ALT+T	To be used if detection has not been run previously
Analyze Marked Range	CTRL+G	
Pause/Continue Analysis	Spacebar	
Cancel Analysis	CTRL+Spacebar	
Show Current Shot Only on Graph	SHIFT+C	
Go to Previous Motion Segment	CTRL+SHIFT+S	
Go to Next Motion Segment	CTRL+SHIFT+F	
Go to Previous Shot	SHIFT+S or J	For Shift+S or F to function, the Cuts timeline must be focused. J and K will work regardless of whether the Cuts timeline is focused.
Go to Next Shot	SHIFT+F or K	
Add Marked Range to PDL	, (comma)	
Add all Shots to PDL	SHIFT+, (comma)	

MTai Frame Generation

The MTai Frame Generation tool allows for creating “new” frames for either Jump Cuts or Slugs.

Note: To use MTai, your workstation must have the “MTI Extras” Installed.

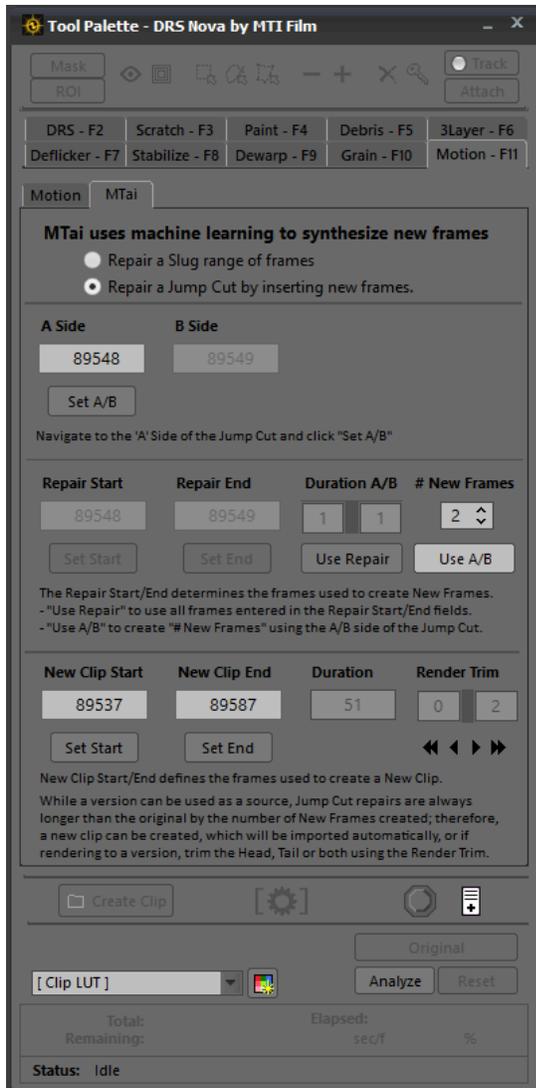
Note: Ensure that cut breaks are located at the head and tail of the shot being fixed.

Jump Cut

A Jump Cut is defined as a point in a sequence of frames where one or more frames are missing resulting in an unintended “jump” in the motion. The shot is shortened by the number of missing frames.

Ensure that cut breaks are located at the head and tail of the shots being fixed.

Fixing a Jump Cut



1. Select the ‘Repair a Jump Cut...’ radio button
2. Navigate to the A side of the Jump Cut and click the ‘Set A/B’ button. The B frame will be set automatically.
3. Choose the Repair method:
 - a. ‘Use Repair’ or ‘Use A/B’

For Jump Cuts the recommended method is Use A/B.

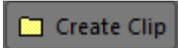
4. Since fixing a Jump Cut requires inserting a new frame(s), there are three render options.
 - l. Rendering to a Version, which allows for trimming the shot at the head, tail or both to maintain sync.
 - a. Press H to mark the whole shot
 - b. Select the frames to trim.
The default is a tail trim.



To trim from the head only, click the double arrow pointing left.

To trim both the head and tail, click the single arrows to adjust the trims.

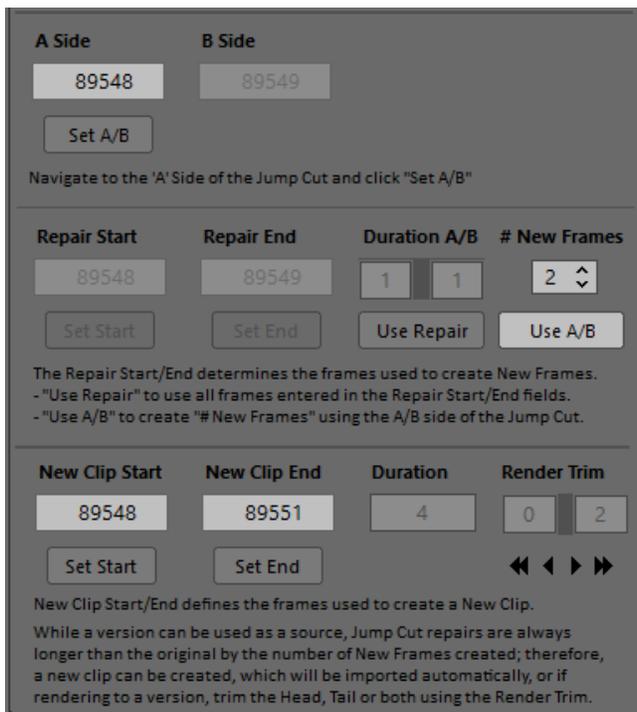
- c. Click the Analyze button or press Ctrl+G.
- d. Preview the result in play by pressing the T key to toggle between Original and Processed frames or by clicking the ‘Original/Processed’ button.
- e. Press Shift+G or click the Gear button.

- II. Rendering a new clip of the **Whole Shot** including the new frames.
 - a. Repeat steps 1 - 3 above then...
 - b. Press the H key to mark the whole shot.
 - c. Click the Analyze button or press Ctrl+G.
 - d. Preview the result in play by pressing the T key to toggle between Original and Processed frames or by clicking the 'Original/Processed' button.
 - e. Click the Create Clip button .

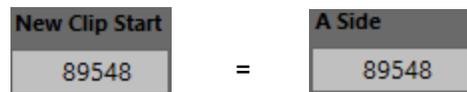
The new clip will be renumbered to accommodate the new frames and imported into the Project Manager.

III. Rendering the **new Inserted Frames** only.

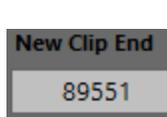
If the shot is long and all the frames in the clip are not required, rendering the original A and B sides with the new frames inserted will provide your editor or colorist with the ability to insert the new frames into their timeline using the A Side value as the sync reference frame.



- a. Enter the New Clip Start = to the A Side



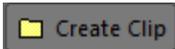
- b. Add # New Frames to the B Side



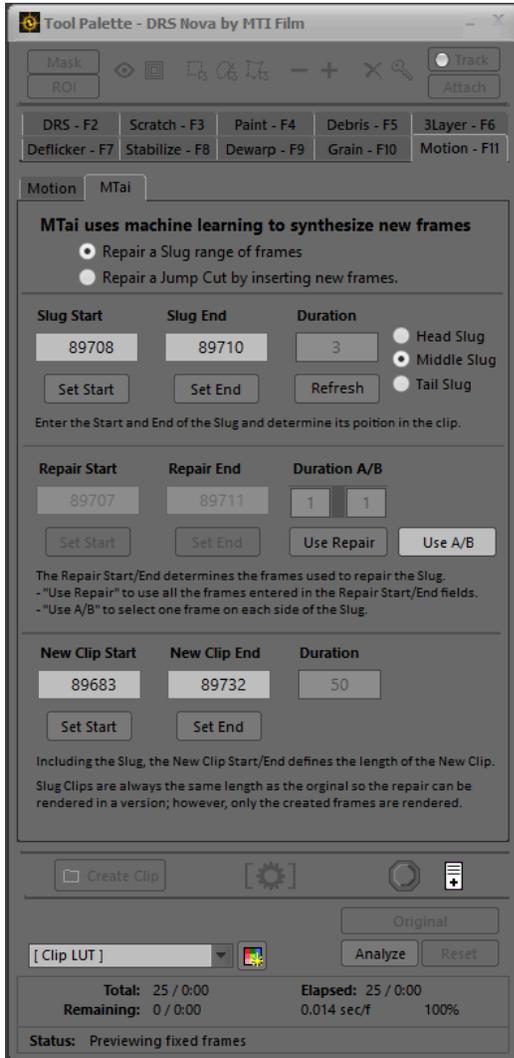
Since the B Side in this case is 89549, adding the 2 # New Frames to it results in a New Clip End of 89551 for a duration of 4. Enter 89551 to the New Clip End.

- c. Click the Analyze button or press Ctrl+G

- d. Preview the result in play by pressing the T key to toggle between Original and Processed frames or by clicking the 'Original/Processed' button.

- e. Click the Create Clip button .

The newly created 4 frame clip will be renumbered and imported into the Project Manager.



Slug

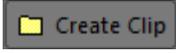
A slug is defined as a group of frames that have been removed and replaced with blank frames in order to maintain sync continuity.

Fixing a Middle Slug

Note: Ensure that cut breaks are located at the head and tail of the shot being fixed.

Since fixing a slug does not alter the duration of a shot, the fix can be rendered in a Version or Exported to a new clip.

1. Select the 'Repair a Slug range of frames' radio button
2. Click the Refresh button
3. Enable the Middle Slug radio button..
4. Navigate to the first frame of the slug and click the 'Slug Start' button.
5. Navigate to the last frame of the slug and click the 'Slug End' button.
6. Select 'Use A/B'
7. Set the New Clip Start and New Clip End. Press the H key to mark the whole shot.

8. Click Analyze
9. Preview the result in play by pressing the T key to toggle between Original and Processed frames or by clicking the 'Original/Processed' button
10. Press Shift+G to render to the current version or click the Create Clip button . The new clip will be imported into the Project Manager..

Note: If there are multiple slugs in a shot or if there are multiple shots containing slugs, you must "refresh" the auto marks for each fix. Click the 'Refresh' button to reset the marks. As a precaution, click the Refresh button prior to fixing the slug.

Fixing Head Slugs

Note: Ensure that cut breaks are located at the head and tail of the shot being fixed.

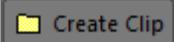
Note: If there are multiple slugs in a shot or if there are multiple shots containing slugs, you must “refresh” the auto marks for each fix. Click the ‘Refresh’ button to reset the marks. As a precaution, click the Refresh button prior to fixing the slug.

Since fixing a slug does not alter the duration of a shot, the fix can be rendered in a Version or Exported to a new clip.

If a slug is located at the head of a shot, MTai uses the frames after the slug to fill the missing frames.

1. Select the ‘Repair a Slug range of frames’ radio button.
2. Click the Refresh button
3. Enable the Head Slug radio button.
 - a. Assuming that cut breaks exist at the head and tail of the shot, the first frame of the shot will be automatically entered into the Slug Start field with the number grayed out.
4. Navigate to the last frame of the slug and click the ‘Slug End’ button.
 - a. The Repair Start will be automatically set to one frame after the Slug End and grayed out.
5. The ‘Use Repair’ option is defaulted to fix the head slug.

Note: The number of frames used to repair the slug depends on motion in the shot and if there is critical picture/sound sync (i.e. someone speaking). If the required sync is at the beginning of the shot and is maintained throughout then using the least amount of frames to repair the slug is preferable. Experiment with the number of Repair frames but it would be best to use, at least, the number of frames equal to the slug. In less critical sync cases, using the full extent of the shot might work best but experimentation is the best course of action.

- a. Navigate to the last frame used for ‘Repair End’ and click the ‘Set End’ button.
This will use the prescribed range of frames after the slug to create the fix.
6. Set the ‘New Clip Start’ and ‘New Clip End’.
 - a. Press the H key to mark the whole shot.
 - b. Alternatively, the ‘New Clip End’ can be set to one frame after the ‘Repair End’ frame.
7. Click Analyze
8. Preview the result in play by pressing the T key to toggle between Original and Processed frames or by clicking the ‘Original/Processed’ button
9. Press Shift+G or click the Gear button to render to the current version
10. Or, if desired, click the create Clip button . The new clip will be created and imported into the Project Manager.

Fixing Tail Slugs

Note: Ensure that cut breaks are located at the head and tail of the shot being fixed.

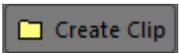
Note: If there are multiple slugs in a shot or if there are multiple shots containing slugs, you must “refresh” the auto marks for each fix. Click the ‘Refresh’ button to reset the marks. As a precaution, click the Refresh button prior to fixing the slug.

Since fixing a slug does not alter the duration of a shot, the fix can be rendered in a Version or Exported to a new clip.

If a slug is located at the tail of a shot, MTai uses the frames before the slug to fill the missing frames.

1. Select the “Repair a Slug range of frames” radio button.
2. Click the Refresh button
3. Enable the Tail Slug radio button.
 - a. Assuming that cut breaks exist at the head and tail of the shot, the last frame of the shot will be automatically entered into the Slug End field with the number grayed out.
4. Navigate to the first frame of the slug and click the ‘Slug Start’ button.
 - a. The Repair End will be automatically set to one frame before the Slug Start and grayed out.
5. The “Use Repair” option is defaulted to fix the tail slug.

Note: The number of frames used to repair the slug depends on motion in the shot and if there is critical picture/sound sync (i.e. someone speaking). If the required sync is at the end of the shot, using the least amount of frames to repair the slug is preferable. Experiment with the number of Repair frames but it would be best to use, at least, the number of frames equal to the slug. In less critical sync cases, using the full extent of the shot might work best but experimentation is the best course of action.

- a. Navigate to the first frame to be used for ‘Repair Start’ and click the ‘Set Start’ button. This will use the prescribed range of frames before the slug to create the fix.
6. Set the New Clip Start and New Clip End
 - a. Press the H key to mark the whole shot.
 - b. Alternatively, the New Clip Start can be set to one frame before the Repair Start frame.
7. Click Analyze
8. Preview the result in play by pressing the T key to toggle between Original and Processed frames or by clicking the “Original/Processed” button
9. Press Shift+G or click the Gear button to render to the current version
10. Or, if desired, click the create Clip button . The new clip will be created and imported into the Project Manager.

Understanding History Files and “GOV”

DRS™NOVA generates “History” files for fixes made in the following tools:

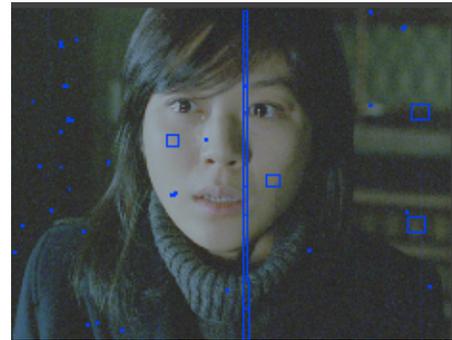
DRS™, Scratch, Paint, and Debris Filters for Shine and AutoFilter

These History files contain the original pixels of the source file, which can be recalled to undo a fix by **right dragging** across the Player, an action known as “Get Original Values” (GOV).

Showing / Hiding History

The History of fixes made on a frame are shown as blue outlines for DRS™, Scratch, and Paint or blue blobs for Shine and Autofilter.

To show History in order to identify areas of the frame that were fixed, press Shift+W. Press Shift+W again to hide the History. To Show or Hide the original pixels without the blue outlines or blobs, press the W key. To reverse these key functions go to the main File/Preferences/General Tab.



Get Original Values Drawing Modes

On the bottom of the UI are 3 buttons, a Rectangle, a Lasso, and a Brush.

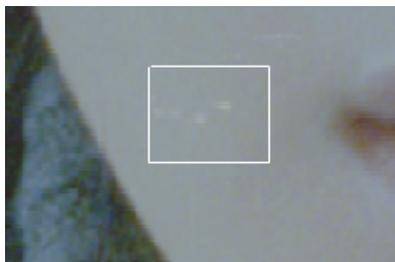
Either of these drawing modes can be used to GOV in all tools.

To switch modes, click the desired button. When in Brush mode, right-click on the player and use the mousewheel to size the brush.



Using GOV to Undo Fixes

Using the Rectangle, right drag across the fix, or using the Brush right-click or drag on the fix. To draw a shape, use the Lasso. After invoking GOV, a white rectangle will encompass the fix and turn off the blue History allowing you to view the original pixels.



Press the T key to toggle between the original and fixed pixels.

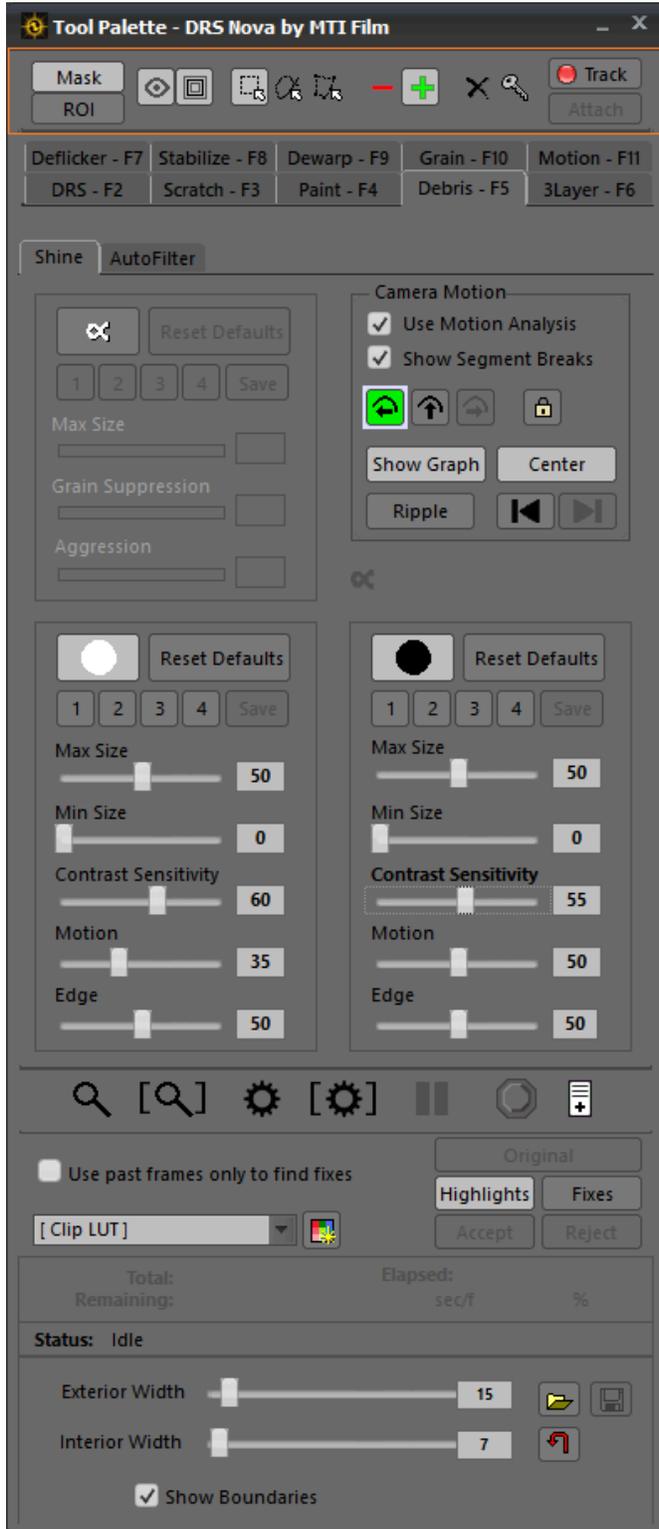
Press G to revert to original pixels or Press A to reject GOV and retain the fix.

Press Ctrl+G to revert in place if the player is moved to a different frame prior to pressing G (pressing G on a different frame will return the player to the GOV frame).

Press Shift+G to revert a marked range of frames.

The Paint tool has an additional mode called “Original Values”, which allows you to paint the original pixels back to the frame with all the attributes assigned to the brush. It does not remove the History and, in fact, adds to it. This will be discussed further in the Paint Tool section.

Mask Tool



Mask Toolbar

The Mask tool has 3 modes of operation:

1. Manual keyframe creation
2. Automated tracking/keyframe creation
3. ROI (Region of Interest)

The Mask and ROI modes are mutually exclusive.

The Mask manual operation is explained in greater detail below. The automated Mask Tracking provides a simple method of adding a tracking point to an object located within the frame and then attaching a mask to it, which will also be explained in detail later.

The ROI (Region of Interest) button found in the Mask Toolbar switches the tool from drawing a mask to drawing a ROI. It is used to draw regions that will be affected by the tool in which it is used. For example, in the Deflicker tool, the ROI defines the area of the frame to be analyzed and processed. In the Debris tool, for both Shine and AutoFilter, the ROI determines the area of the frame that will be modified; each drawn area is processed for the debris found within the region.

Mask Properties Window

Masks allow you to include or exclude certain regions of the frame while processing in the following tools:

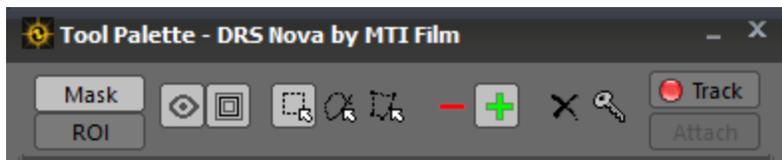
- Paint
- Debris / Shine
- Deflicker / Zonal
- Grain

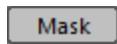
The following tools do not use Masks because they have their own Processing Region settings:

- DRS™ - (does not have any Processing Region)
- Scratch
- 3 Layer
- Stabilize
- Dewarp

In these tools, the Mask Toolbar is disabled.

Mask Tool Bar Button Functions



-  Enable/Disable Mask - SHIFT+i
-  Enable/Disable Visibility of Mask - CTRL+i (processing is unaffected)
-  Show/Hide Mask Properties Window - CTRL+SHIFT+i
-  Mask Shapes: Rectangle, Lasso, Bezier - Press Q to cycle through shapes
-  Choose Exclusive or Inclusive Mask - Press i to toggle
-  Affects Mask or Vertex. While Mask(s) or Vertex (vertices) is selected:
 - Press A key to neutralize
 - Press SHIFT+A to delete
 - Press CTRL+A to select all Masks
-  Set keyframe on Mask timeline - Press B to add, Press CTRL+B to delete while the cursor is resting on the keyframe
-  Track a user placed tracking point to an object in the frame
-  After tracking, draw a mask and “Attach” the mask to the tracking point
-  Enable ROI mode. When ROI is enabled, drawing a mask is disabled.

Mask Properties Window



The Mask Properties Window has functionality to adjust the Exterior and Interior Border Width of the blending or “feathering” boundaries. Anytime a mask is selected or moved, the boundaries are hidden but still functional.

Mask Properties Buttons

-  Opens dialog to find a mask
-  Opens dialog to save mask(s)
-  Resets width sliders to nominal setting

To hide the boundaries but not disable them, uncheck the Show Boundaries checkbox.

Drawing and Manipulating Masks

Note: Before beginning, turn on the Mask timeline by pressing the] (close bracket) key or right-clicking on the blue timeline slider at the bottom of the UI and choose Show/Hide - Mask Animation from the context menu. To hide the Mask timeline press SHIFT+].

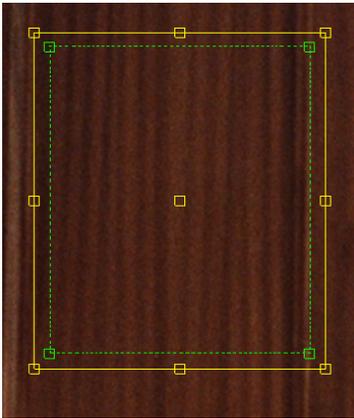
Drawing

To draw a mask, first select the shape of the mask. Press the Q key to cycle through the shapes. Click anywhere on the Player Window and draw the mask by dragging the mouse. To draw additional masks, select the shape and click on the player again and drag.

Selecting and Deselecting

To select a mask, SHIFT+Click on it. If there are more than one mask present and you wish to add a mask to the selection, SHIFT+Click on it. If you wish to change which mask selected, press CTRL+Click on the desired mask. To select all masks, press CTRL+A.

To deselect a mask(s), either SHIFT or CTRL+Click anywhere in the Player Window that is clear of a mask.



Sizing a Mask

To size a mask, first select it. A yellow border will appear.

Select any of the yellow vertices and adjust it as desired. To maintain the aspect ratio of the mask, press and hold **SHIFT** prior to selecting the yellow vertex and while adjusting its size.

Rotating a Mask

To Rotate a mask, select it, click anywhere outside the mask and move the mouse in the desired direction of rotation.

Manipulating the shape of a Mask

To manipulate the shape of a mask, click on a vertex and adjust it as desired. To select more than one vertex, **SHIFT+Click** on additional vertices or **SHIFT+Drag** anywhere adjacent to the mask and across the desired vertices. During the dragging process a white serrated line will appear; use it as a guide for the selection. Be aware that manipulating a mask requires that at least one vertex be unselected, otherwise, the mask will be moved.

To deselect a vertex from a group selection leaving the balance of vertices selected, **SHIFT+Click** on it.

To select a vertex in a group selection leaving the balance of vertices deselected, **CTRL+Click** on it.

Moving a Mask

To move a mask(s) select it and move it to another position in the Player Window. Moving a mask will automatically add a keyframe to the Mask timeline. If you wish to move the mask to a new position based upon a new timecode location of the clip, simply locate the clip to the timecode location and reposition the mask. The mask will automatically move linearly from its original position to the new one when in play mode.

When moving a mask, or when in play mode, the blend boundaries will automatically be disabled for the duration of the move. This does not affect the processing, just the visibility.

Working with Multiple Masks

Working with multiple masks can present a challenge when movement and manipulation of each needs to be done at different times. Therefore, it is best to start by assessing how many masks are needed for a shot. Draw the masks in their start position and then move them as needed.

Working with Keyframes

When a mask is repositioned, a keyframe is automatically added to the timeline. If you wish to step through the keyframes, make sure that the Mask timeline is active and selected (press the] key). Press SHIFT+S or F to step through the keyframes backward and forward respectively.

If a mask moves to an unwanted position because of a keyframe, the keyframe can be neutralized by the following steps:

1. Make sure the Mask timeline is selected (])
2. Step back to the location where the mask is correctly positioned (SHIFT+S)
3. Select the mask (SHIFT+Click on it)
4. Step forward to the unwanted keyframe (SHIFT+F)
5. Deselect the mask (SHIFT or CTRL + Click anywhere in a non-mask area of the player)

The keyframe will inherit the corrected position.

Adding and Deleting Keyframes

To add a keyframe press the B key.

To delete a keyframe press CTRL+B while the cursor is resting on its position.

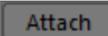
Using Automated Mask Tracking

By tracking an object in the frame, it is possible to “attach” a mask to the tracked object and have the mask follow the tracked path. To gain more knowledge of how to use tracking points, it is recommended that you read this section in the Stabilize Tool: [Steps for Manual Stabilization](#)

Simple Steps to Track an Object and Attach a Mask:

1. Establish In and out points for the Shot and go to the first frame of the shot
2. Click the Tracking button in the mask tool 
3. Place a tracking point on the object and press the T key or click the Track button
4. Click the Mask Button  to enable the mask drawing mode.

Note: In the Paint Tool, since the mouse cursor becomes a paint brush, it is necessary to convert the brush to a mask drawing cursor. Therefore, press the Mask button in the tool to enable drawing a mask 

5. Draw a mask around the tracked object
6. Click the Attach button,  go to the first frame of the shot and press Play

You can adjust the shape of the mask on any frame by clicking its vertices and moving them as desired. Keyframes for those frames will be automatically created.

Split Screen and Side by Side Views

DRS™NOVA includes Split Screen and Side by Side modes.

Note: For all of the views in this section, it is important to remember that the last clip selected will always appear on the right. To switch sides, press Page Up or Page Down.

Split Screen View

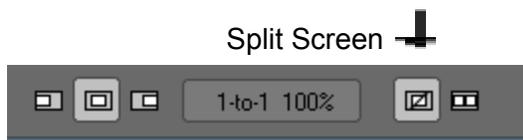
There are two ways the Split Screen View can be used:

1. **Preview Fix Mode.** In this mode, after a fix preview is invoked, the current clip is placed in a split screen with the processed frame showing and the split divider on the extreme left. Moving the split divider to the right reveals the unprocessed frame.
2. **Dual Clip Mode.** In this mode the last two selected clips are placed in a split screen with the first clip selected on the left and the last one selected on the right.

NOTE: The two modes are discussed in greater detail later in this section.

Entering Split Screen View

For either of the above modes, to enter the Split Screen View press the Backspace key or click the button on the lower right of the Toolbar Ribbon. To exit Split Screen mode, press Backspace again or Escape (Esc). Press the Z key to return the Player Window to full screen.



Controlling the Split Screen Divider

The split screen Divider is controlled in 4 ways:

1. left-click on the Player Window and drag in the desired direction
2. Press Page Up or Page Down to toggle between the unprocessed and processed frame
3. Press and hold CTRL+SHIFT while rotating the mouse wheel
4. Press and hold CTRL+SHIFT while pressing the arrow keys

Changing the Angle of the Split

1. To change the angle of the split, press and hold CTRL+SHIFT+ALT key while rotating the mouse wheel

2. Double click on the Player Window to change to a vertical or horizontal split

Side by Side View

There are two ways the Side by Side View can be used:

1. **Preview Fix Mode.** In this mode, after a fix preview is invoked, the selected clip is placed side by side with the unprocessed frame(s) on the left and the processed frame(s) on the right
2. **Dual Clip Mode.** In this mode the last two selected clips are placed side by side with the last selected clip on the right and the previously selected one on the left

Entering Side by Side View

To enter Side by Side View press SHIFT+Backspace or click the button on the lower right of the Toolbar Ribbon. To exit the Side by Side mode, press SHIFT+Backspace again or press Escape (Esc).



 Side by Side

Preview Fix Mode

Previewing a Tool Fix in the Split Screen View:

1. Select the clip
2. Invoke the fix preview mode as dictated by the tool's commands (i.e. the D key)
3. Enter the Split Screen view (press Backspace) - the Divider appears on the left
4. Control the Divider as described above to view the before and after states of the preview; the unprocessed frame is on the left and the processed frame is on the right
5. Accept (G key) or reject (A key) the fix
 - a. Either way, the split screen view is terminated
 - b. Or, cancel the Preview by pressing Backspace or Escape

Previewing a Tool Fix in Side by Side View:

1. Select the clip
2. Invoke the fix preview mode as dictated by the tool's commands (i.e. the D key)
3. Enter the view (press SHIFT+Backspace)
4. The unprocessed frame is on the left and the processed frame is on the right.
5. Accept (G key) or reject (A key) the fix.
 - a. Either way, the side by side view is terminated

- b. Or, cancel the Preview by pressing Shift+Backspace or Escape

Dual Clip Mode

The Dual Clip Mode is used for viewing only. Tools are not active during this mode.

To View two different clips in either Split Screen or Side by Side modes:

1. Select two different clips, the last one selected will be on the right
2. Press the corresponding view hotkey combination or click its button
3. Press any navigation key to view the two clips

NOTE: The two selected clips must be of the same resolution.

Zoom QC Mode

Overview

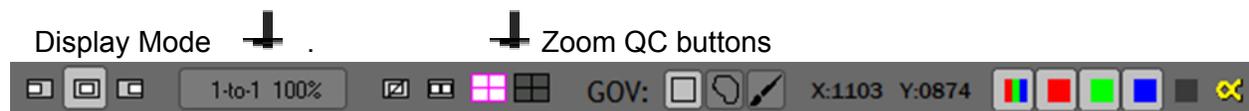
Zoom QC mode allows the user to divide the screen into four quadrants and zoom each quadrant to fit within the full monitor display area.

Zoom QC mode has two mutually exclusive sub-modes:

1. ROI mode (Region of Interest). Allows a user created ROI that will be divided into quadrants.
2. Quad mode, which displays quadrants.

In Quad mode, all repair functions of DRS™ Nova are available, but the primary tools to be used would be DRS™, Scratch, Debris, and Paint since Zoom QC is intended for final QC.

Zoom QC is entered by clicking on either of the two associated buttons found on the right side of the tool ribbon in the main window. The Display Mode button switches between TrueView and 1-to-1 modes and can be used to adjust the amount of zoom applied.



The left Zoom QC button enters ROI mode and the right button enters Quad mode.

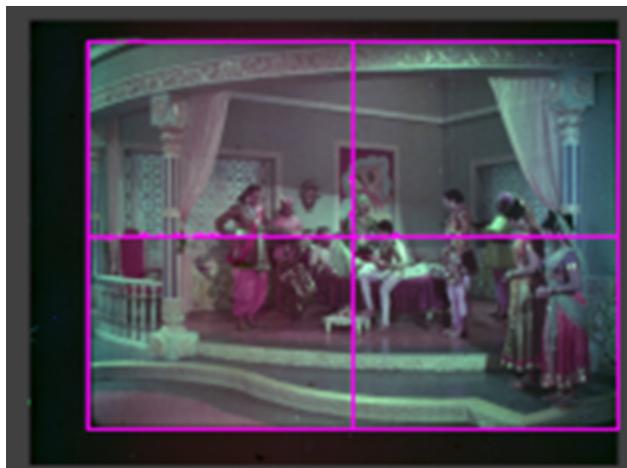
ROI Mode  

When first enabled, the ROI is set to the entire frame and the display zooms back to show the entire image. The Quad button displays all quadrants in white.



The entire image is shown together with magenta lines representing the quadrants. These lines can be toggled on and off using the hotkey **ALT + ↓** or clicking the ROI mode button.

The ROI may be now redrawn as shown below using a typical left mouse drag.



Esc(ape) will exit Zoom QC mode and save the last drawn ROI. To reset the ROI to the entire frame, press Shift+Click ROI button.

Quad Mode   

Enter Quad Mode by clicking on the Quad Button. Quad Mode automatically enters Presentation mode eliminating all menus, and fits the first quadrant (upper left) into the display. In addition, the tool ribbon is automatically displayed when the player is in stop and hidden during play.

How the quadrant is initially zoomed depends on the Display Mode of DRS™Nova:

In TrueView the initial zoom is set to the largest zoom, displaying the entire quadrant including some overlap.

In 1-to-1, the zoom factor is set pixel to pixel. As a result, you may not see all parts of the quadrant depending on your screen resolution. You may need to click the Display mode button again or zoom to the desired size.

Once initially zoomed, the display can be moved or zoomed as normal. If the zoom is manually changed, the new zoom value is used for subsequently selected quadrants. The zoom can be reset to the default zoom by clicking the ROI Mode button and then the Quad Mode button.

If in TrueView and wish to return to 1-to-1 100% mode, Hold Shift+click Quad button.

Once in Quad Mode, clicking the Quad button or pressing **ALT + █** will cycle through the quadrants. During the move to the next quadrant, an image representing which quadrant is active is briefly displayed.

Note: Because the Paint Tool uses ALT+arrow keys, the Zoom QC functions are disabled; however, the Toolbar Ribbon buttons can be used alternatively.

Hotkeys are only active when in Zoom Review mode. These are

- | | |
|------------------------------|--------------------------------|
| ALT + → (Right Arrow) | Same as Next Quad button |
| ALT + ← (Left Arrow) | This chooses the previous Quad |
| ALT + ↓ (Down Arrow) | This Toggles the Quad Line. |

If required, learn about the methods of zooming by clicking on the link: [Zooming and Positioning](#)

Global Shortcut Keys

Function	Keys	Note
General		
Help	F1	
Increase Value	Up arrow	SHIFT = greater increments, CTRL = less
Decrease Value	Down arrow	SHIFT = greater increments, CTRL = less
Select DRS Tool	F2	
Select Scratch Tool	F3	
Select Paint Tool	F4	
Select Debris Filter Tool	F5	Repeated presses toggles between subtools
Select 3 Layer Tool	F6	
Select Color/Flicker Tool	F7	Repeated presses toggles between subtools
Select Stabilization Tool	F8	Repeated presses toggles between subtools
Select Dewarp Tool	F9	
Select Grain Tool	F10	
Select Motion Tool	F11	
Save Parameters	CTRL+S	For certain tools
Load Parameters	CTRL+L	For certain tools
Add shot to PDL	, (comma)	Add event to PDL
Add all shots to PDL	SHIFT+, (comma)	
Clip Management		
Toggle last two selected Clips	PgUp or PgDn	
Previous clip in Master Bin	SHIFT+PgUp	
Next clip in Master Bin	SHIFT+PgDn	
Previous clip in Version Bin	CTRL+PgUp	
Next clip in Version Bin	CTRL+PgDn	
Split Screen Mode	Backspace	Use Ctrl+Shift+mousewheel to move the split. Double clicking the image changes the diagonal split to horizontal.
Side by Side Mode	SHIFT+Backspace	Double clicking again changes horizontal to vertical. To revert to diagonal, press Ctrl+Shift+Alt+move the mousewheel once. Press Esc or Backspace to exit the mode.

Navigation		
Go to beginning of clip	Home	
Go to end of clip	End	
Play Forward	V	
Play Backward	X	
Fast Forward	V V / V V V	Twice for 2x speed / Thrice for Fast Forward
Fast Rewind	X X / X X X	Twice for 2x speed / Thrice for Fast Rewind
Loop Play In to Out	SHIFT+V	
Loop Play 8 frames before/after	SHIFT+X	Loop play from current position
Stop	C	
Jog Forward	F	Hold key down for continuous jog
Jog Backward	S	Hold key down for continuous jog
Go to Next event of selected timeline	SHIFT+F	Or press the K key
Go to Previous event of selected timeline	SHIFT+S	Or press the J key
Go to Next Cut	J	
Go to Previous Cut	K	
Toggle Play and Stop	Spacebar	
Display		
Toggle Processed Fix Highlights / Present Values	SHIFT+W or W	Depends on how Preference is set
Toggle Original Values / Present Values	W or SHIFT+W	Depends on how Preference is set
Last Frame Fix	Insert	Go to last frame with fixes
Next Frame Fix	Delete	Go to next frame with fixes
Zoom to cursor position in steps	Y	Or, Hold Z key down and mousewheel up
Zoom out in steps	SHIFT+Y	Or, Hold Z key down and mousewheel down
Zoom out to full screen	Z	
Scroll Mode - U Key	U	After zooming, hold down the U key and use mouse to scroll image
Scroll Mode - Z Key	Z	After Zooming, hold down the Z key and left-click on player and use mouse
Full Screen view toggle	\	Removes File menu at top of Main Screen
Presentation Screen view toggle	SHIFT+\	Removes File menu at top of Main Screen and

		Toolbar Ribbon at bottom of screen
Abbreviated Toolbar Ribbon view	L	Toggles Abbreviated Toolbar Ribbon on/off
Toolbar Ribbon view	SHIFT+L	Enables Presentation Screen Toolbar Ribbon during play mode
Show/Hide Tool Palette	. (period)	
View all color channels	CTRL+0	On number pad only
View Red Channel only	CTRL+1	On number pad only
View Green Channel only	CTRL+2	On number pad only
View Blue Channel only	CTRL+3	On number pad only
View Black and White	CTRL+4	On number pad only
Show/Hide Alpha Channel	CTRL+5	On number pad only
Show/Hide all Reticles	ALT+0	On number pad only
Show/Hide Primary Reticle	ALT+1	On number pad only
Show/Hide Action Safe	ALT+2	On number pad only
Show/Hide Title Safe	ALT+3	On number pad only
Reticle Selector Dropdown field	No key	Use mouse to select
Entering and Navigation of Time Values		
Mark In	E	
Mark Out	R	
Go to In	SHIFT+E	
Go to Out	SHIFT+R	
Clear In	CTRL+E	
Clear Out	CTRL+R	
Mark IN to OUT of current shot	H	
Mark Entire Clip	SHIFT+H	
Add Keyframe	B	To Mask and Global Deflicker Timelines
Drop Keyframe	CTRL+B	To Mask and Global Deflicker Timelines
Add Cut	N	To Cuts Timeline
Drop Cut	CTRL+N	From Cuts Timeline
Number Pad	+ or - (#)	Move forward or back by number entered

Number Pad	*	On Keypad - Jog forward
Number Pad	/	On Keypad - Jog backward
Copy value from Time Counter Register	CTRL+C	Copies timecode or frame number values
Paste value to Time Counter Register	CTRL+V	Pastes timecode or frame number values
Timeline		
Select Cuts Timeline	O	Hide: SHIFT+O
Select Bookmarks Timeline	P	Hide: SHIFT+P
Select Motion Timeline	[Hide: SHIFT+[
Select Mask Animation Timeline]	Hide: SHIFT+]
Bookmarks Timeline Only (no Event Viewer)		
Show and focus Bookmark timeline	P	
Hide Bookmark timeline	SHIFT+P	
Add a Bookmark	M	
Go to previous Bookmark	SHIFT+S	The Bookmark timeline must be focused for these functions.
Go to next Bookmark	SHIFT+F	
Delete a Bookmark	CTRL+M	
Bookmark Event Viewer		
Show / Hide Bookmark Event Viewer	CTRL+SHIFT+M	When hiding, the timeline will remain
Add a Bookmark Event and Mark In	M	Or click the Add button
Re-Mark In for current Bookmark Event	ALT+E	Or click the Mark In button
Mark Out of current Bookmark Event	ALT+R	Or click the Mark Out button
Bookmark the Shot	CTRL+H or SHIFT+M	Or click the Bookmark current shot button 
Go to current event Mark In	CTRL+SHIFT+E	
Go to current event Mark Out	CTRL+SHIFT+R	
Go to Previous Bookmark	CTRL+SHIFT+S	The Bookmark timeline must be focused for these functions
Go to Next Bookmark	CTRL+SHIFT+F	
Delete a Bookmark	CTRL+M	Must be located on Bookmark
Mouse Functions		
Get Original Values (GOV)	Use in any tool, however, Get Orig Values applies only to fixes made in DRS™,	Choose the mode, Rectangle, Lasso, Brush. Right Drag to show the original values. Press T to toggle between the original and fixed

	Scratch, Paint, and Debris Filter	pixels. Press G to revert to the original pixels or press A to retain the fix. Press Shift+G to revert a marked range.
Mouse Wheel		Duplicates functions of Up/Down arrows
ALT+Mouse Wheel		Duplicates functions of Left/Right arrows

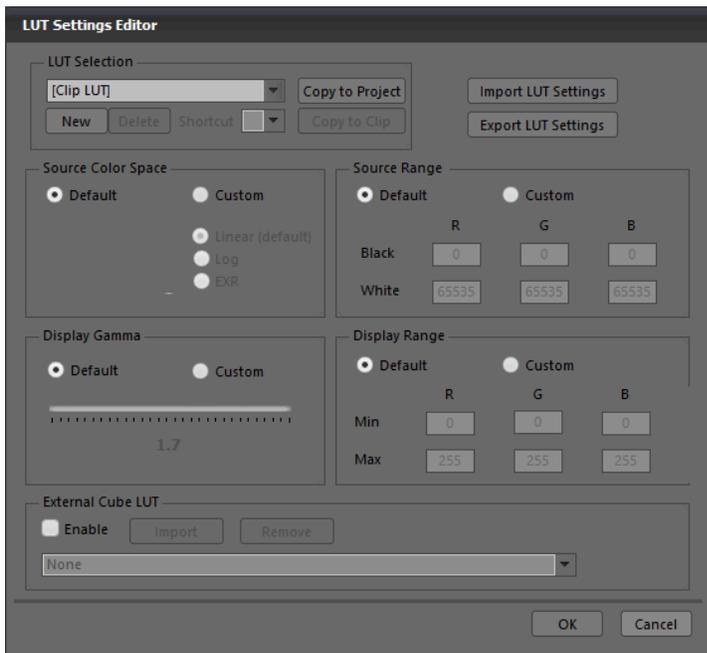
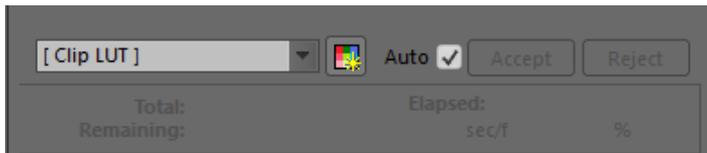
LUTs

DRS™NOVA supports 1D LUTs created by the application or you can import Cube LUTs. There are 4 types of LUTs:

1. Project LUT - The Project LUT will apply the settings to all clips found in the project when the Project LUT option is selected. It is suggested to use the Project LUT as a default
2. Clip LUT - Use of the Clip LUT allows for each clip to have its own unique settings
3. User defined and named - Create and name a LUT as desired
4. Import a Cube LUT

Creating a DRS™Nova 1D LUT Look

On the lower left of the Tool Palette there is a drop-down field with a RGB LUT button to its right.



1. Click the button to open the LUT Settings Editor
2. Use the Source Color Space to determine the starting point for the LUT. The recommended setting is Linear. If the source file is EXR then choose EXR
3. Use the Source Range to determine the high and low luminance settings. If the Custom radio button is enabled, a Lock icon will appear. With the Lock icon enabled any changes made to the Red channel will equally affect the Green and Blue channels.
4. Use the Display Gamma as desired
5. Use the Display Range to lower contrast
Hint: The higher the Min, the darker the effect. The lower the Max, the brighter the effect.

Creating and Naming a New 1D LUT

To create a new user defined LUT, click the New button and name the LUT. Adjust the settings as desired and press the OK button.

Deleting a User Defined 1D LUT

To delete a LUT, select the LUT from the drop-down list in the LUT Settings Editor and click the Delete button.

Importing and Exporting a DRS™NOVA Generated 1D LUT

Once a LUT is created, it can be Exported and Imported into another DRS™NOVA workstation. Use the Import and Export LUT Settings buttons to perform these actions.

To Apply a Clip LUT to another Clip

1. Choose the clip to copy from
2. Click the RGB LUT button to open the LUT Settings Editor
3. Click the Export LUT Settings button and export to a known location and click Okay
4. Choose the clip to which to import the LUT
5. Click the RGB LUT button to open the LUT Settings Editor
6. Click the Import LUT Settings button
7. Open the location where the LUT was exported
8. Click Open or double click the LUT file
9. Click Okay

Importing a Cube LUT

1. Click the RGB LUT button to open the LUT Settings Editor
2. At the bottom left of the Editor, enable the External Cube LUT checkbox
3. Click the Import button and navigate to the desired LUT file
4. Select the file and click the Open button or double click the LUT file
5. The LUT will load.
6. Click Okay

Removing a Cube LUT

1. Click the RGB LUT button to open the LUT Settings Editor
2. From the Cube dropdown list choose the LUT to remove
3. Click the Remove button. The LUT is removed from the list.
4. Click Okay

Creating and Using Aspect Ratio Reticles

DRS™NOVA supports default Industry standard reticles for Full and Academy apertures at various aspect ratios. User defined ones can also be created.



In the lower left corner of the UI, is a drop-down field with a button to open the Reticle Overlays Editor and five buttons for controlling the visibility of the different reticle boundaries. The buttons' functions from left to right include:

1. Enable all reticles views
2. Primary Boundary
3. Safe Action
4. Safe Title
5. Gray Overlay to the Primary Boundary

To select a Default reticle, click the down arrow on the drop-down field and choose a reticle.

To create a user defined reticle

1. Click the Reticle Overlay Editor button
2. Select a Default closest to the one desired
3. Adjust the Aperture, Offset and Scale settings as desired
4. The Reticle Name will change to "New"
5. Name the reticle
6. Click Save. The reticle will be added to the list.

Reticles Shortcut Keys

Show/Hide all Reticles	ALT+0	On number pad only
Show/Hide Primary Reticle	ALT+1	On number pad only
Show/Hide Action Safe	ALT+2	On number pad only
Show/Hide Title Safe	ALT+3	On number pad only
Reticle Selector	No key	Use mouse to select

Using Presets

Various Tools can use Presets including:

1. Debris - Shine and Autofilter
2. Deflicker - Mistime (Auto mode), Global, Zonal
3. Stabilize - Manual only
4. Dewarp
5. Grain - Grain Reduction and Aperture are grouped. Grain Create has its own.

Selecting and Recalling Presets

Press 1, 2, 3, 4 on the keyboard to recall the saved values. Alternatively, click the buttons.

Saving Presets

1. Select the Preset for which you want to save values
2. Set the values
3. Click the “Save” button

Selecting a Preset without Recalling the Saved Values

It may be necessary to replace saved preset values with the current ones shown.

1. Press Shift+ 1, 2, 3, 4 on the keyboard to select the preset but retain the current values. Alternatively, press Shift+click the preset button.
2. Click the “Save” button

Using the AutoMark Function

The AutoMark function provides the ability to automatically mark a shot in and out as the cursor enters the shot. To toggle the mode on and off, press Ctrl+[(left bracket) or press Ctrl+click the Scissors icon on the Cuts timeline.

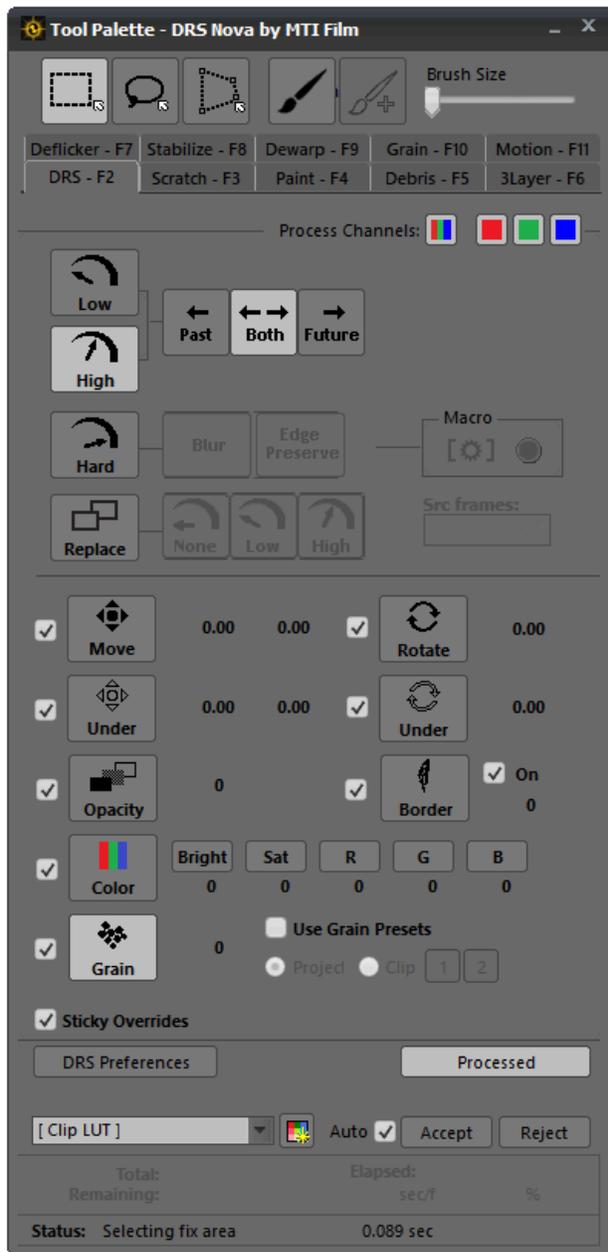
The advantage of this function is that you can easily add shots to a PDL without having to mark each shot as you navigate the timeline thereby saving button strokes and time.

Note: If AutoMark is enabled, the Mark In and Out commands (E and R) will override the AutoMark function on the current shot only.

Using the DRS™ Tool

The DRS™ Tool provides a variety of restoration techniques based upon temporal interpolation of the current and surrounding frames, or spatial corrections using the current frame.

Note: DRS™ maintains a History file of its fixes, therefore these fixes can be returned to their original state (Get Original Values or paint Original Values in the Paint tool).



Modes of Operation

DRS™ has four modes of operation:

1. Low Motion
2. High Motion
3. Hard Motion
4. Replace

Low and High Motion

These modes of operation offer three temporal options to calculate fixes:

- a. Past – uses previous frames
- b. Both – uses previous and succeeding frames
- c. Future – uses succeeding frames

The difference between Low and High modes is that the High mode uses a wider “search area” to calculate its fix. You should experiment with both modes to see which does the best job for the problem at hand.

To select Low Motion press the 1 key or click on the corresponding button. Pressing the 1 key repeatedly will cycle through the three temporal options.

To select High Motion press the 2 key or click on the corresponding button. Pressing the 2 key repeatedly will cycle through the three temporal options.

Hard Motion

This mode is used for fixes where temporal corrections are not suitable. For example, if a piece of dirt is on the edge of an arm and the motion of the arm is extreme, temporal fixes may produce undesirable results. Hard Motion uses spatial correction of the image thus eliminating artifacts caused by surrounding frames of a temporal correction.

Hint: Hard Motion should only be used on small fixes since it inherently must blur the picture. Adding a small amount of grain to match the surrounding grain is also advised.

There are two options for Hard Motion.

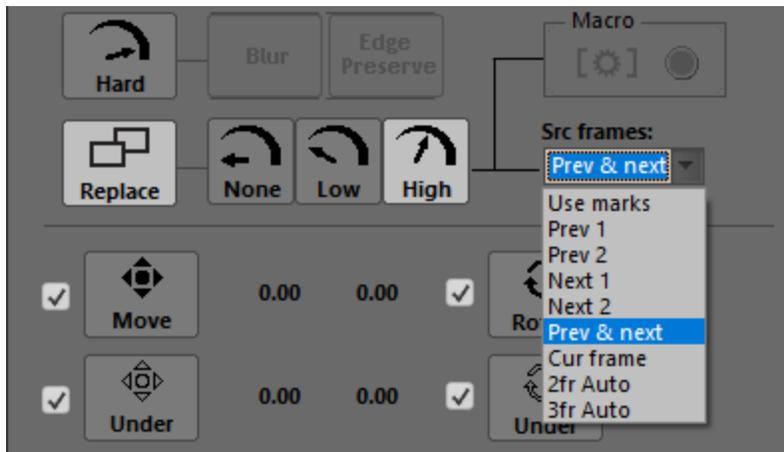
- a. Blur – where the image is blurred concentrically toward the middle of the fix.
- b. Edge Preserve – where the edges of the subject image are preserved.

If you wish to render the same fix over a marked frame range, use the Macro Icon or press SHIFT+G

To select Hard Motion press the 3 key or click on the corresponding button. Press the 3 key repeatedly to toggle through the two options.

Replace

This mode “borrows” pixels from source frames using 3 motion choices. To select Replace press the 4 key or click the button. Press the 4 key repeatedly to cycle through the 3 motion options.



< Render Icon used to execute Hard Motion Macro and Auto Replace process.

The Source Frames drop-down field (Src frames:) selects which source frames will be used for fixes as follows:

1. Use Marks (default selection)
 - a. From the Mark IN if no Mark Out is present
 - b. From the Mark OUT if no Mark In is present
 - c. From the Marks IN and OUT if both are present
2. Prev 1 - From the previous frame
3. Prev 2 - From the previous two frames
4. Next 1 - From the next frame
5. Next 2 - From the next two frames
6. Prev & Next - From the previous and next frame
7. Cur frame - Current frame
8. 2fr Auto - Replaces 2 frames in sequence beginning on the frame after the Mark In
9. 3fr Auto - Replaces 3 frame in sequence beginning on the frame after the Mark In

In all cases, except 2fr and 3fr Auto, you can use normal lassoing techniques. 2fr and 3fr Auto will automatically invoke a full frame replacement so there is no need to lasso.

Auto Replace

The Replace mode has two processes for automatically replacing 2 or 3 frame sequences. They work as follows assuming the Mark In is 1 frame before the first missing frame.

2fr Auto

Step 1 - uses frames 1 and 4 to create frame 2

Step 2 - uses frames 2 and 4 to create frame 3

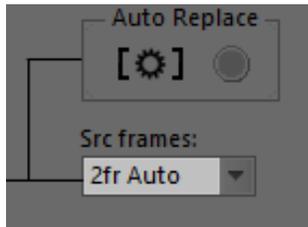
3fr Auto

Step 1 - uses frames 1 and 5 to create frame 3

Step 2 - uses frames 1 and 3 to create frame 2

Step 3 - uses frames 3 and 5 to create frame 4

To execute the process:



1. Click the Replace mode button
2. Mark in one frame before the first frame to be replaced (a Mark out is not necessary)
3. From the “Src frames” field, choose which of the two Auto functions you wish to execute
4. Click the Auto Replace icon button or press SHIFT+G to render the frames

NOTE: You do not have to draw a Region of Interest (ROI) as it will be done automatically.

Mode Overrides

Each mode has “Overrides”; adjustments that can be made to the fix operation. The Overrides are:

- a. Move Over/Under
- b. Rotate Over/Under
- c. Opacity
- d. Border
- e. Color
- f. Grain

Overrides can persist through a series of fixes if the **Sticky Overrides** checkbox is enabled. This is useful when a combination of Overrides contribute to make the result of a fix applicable to other fixes requiring the same result.

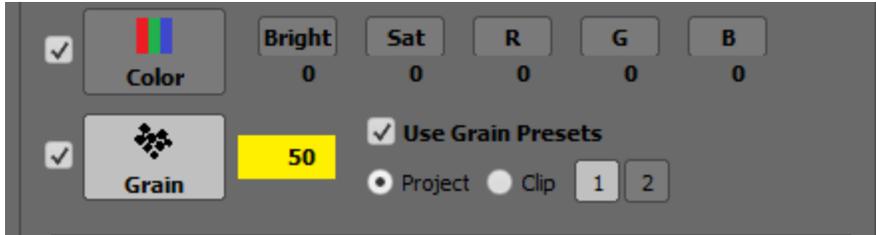
If you do not want the Overrides to persist from one fix to another, uncheck the Sticky Overrides checkbox found at the bottom of the tool.

Using the Grain Tool Presets for Grain Override in DRS™

The Grain override can be used in two different ways

1. Using the presets established in the Grain Tool
2. Using the “noise” generated by the native DRS™ grain tool.

To use the presets, enable the Grain Override button and the “Use Grain Presets” checkbox located to its right. Then select the Grain Preset from either the Project or Clip settings.



When the preset is enabled, the intensity is automatically set to 50. Use the up and down arrows or mouse wheel to vary the intensity.

Drawing the Fix

Drawing Tools

The DRS™ Tool provides four types of drawing tools to fix a Region of Interest (ROI): Rectangle, Lasso, Bezier, and Brush.

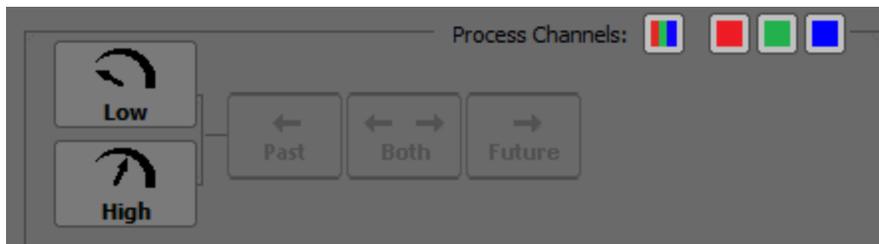


The size of the brush is adjusted by using the mousewheel or slider.

Pressing the Q key will toggle through the drawing tools in succession, or click directly on the desired button. Choose your drawing tool and then left-click and drag to surround your fix area. While in the Rectangle, you can press and hold CTRL to draw a free form lasso.



The Brush+ button allows you to paint multiple brush strokes using Hard Motion inpainting on a frame and repeat them on other frames. It automatically selects the Hard Motion mode of operation. You can choose Blur or Edge Preserve. To repeat the strokes on another frame, press the ~ key or Shift+G to repeat the strokes on a marked range of frames.



By default, all three channels will be fixed; however, you can disable processing on one or more channels by clicking their buttons.

Quick Select

The Quick Select (D key) is used for small debris. Place the center of the cursor over the debris and then press D. You can change the size and shape of the Quick Select area by clicking Edit Preference at the bottom of the DRS™ tool and then choosing the Quick Select tab in the tool preferences.

- a. Press T to toggle between the fix and the original defect.

Hint: Use the Factory settings as they are optimized for the tool and resolution. This is found under Edit Preferences at the bottom of the tool.

Note: Quick Select is not operational when the paint brush is used; when used, the D key switches focus to the Brush Size slider.

Toggling Between the Fix and the Original Pixels

After drawing a fix, press the T key to toggle between the fix and the original pixels.

Rejecting or Accepting Pending Fixes

- a. Reject a fix by pressing the A key.
- b. Accept a fix by pressing the G key.
- c. Auto-Accept. In DRS™ Auto-Accept is always enabled so a pending fix is accepted whenever a new fix is drawn. If you wish to disable Auto-Accept, click Edit Preferences at the bottom of the tool and uncheck the checkbox on the bottom of the tool preferences.
- d. If you navigate away from the frame with the pending fix, you can press CTRL+G to accept the pending fix without moving away from the current frame. Pressing G will accept the pending fix and jump back to the fixed frame.

Repeat Last Action

To repeat the last action on any frame, press the ~ key. This will exactly repeat the last action whether a fix or GOV.

Note: The paint tool is an exception in that the ~ key (or button) will repeat the last paint stroke(s) while Shift + ~ will repeat the last GOV.

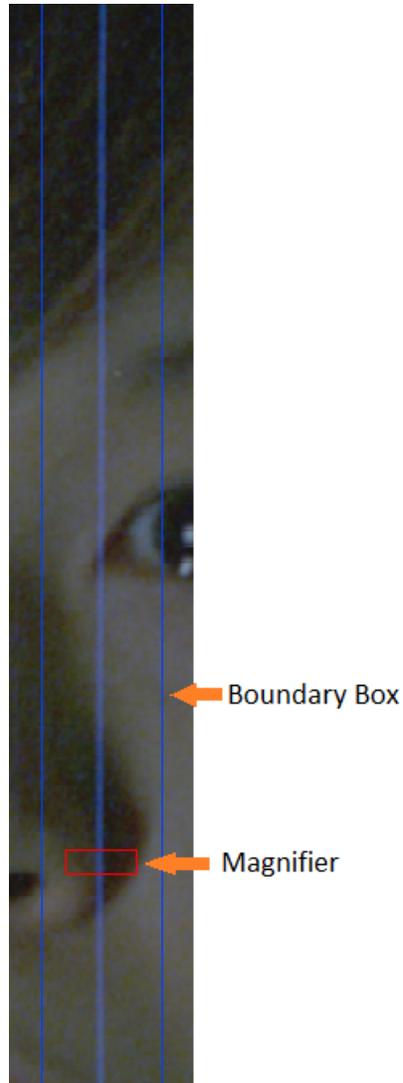
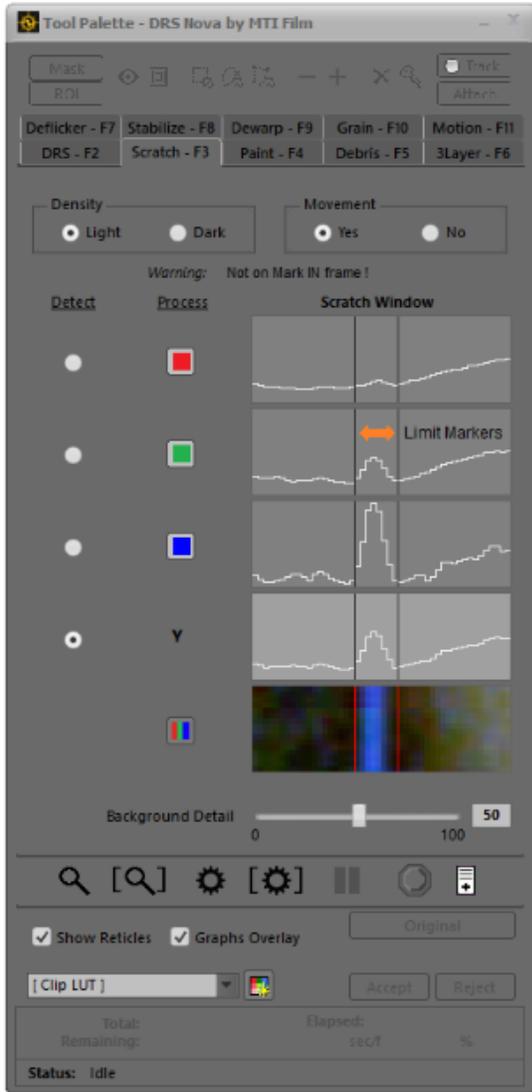
DRS™ Shortcut Keys

Function	Keys	Note
Low Motion	1	Cycle Past, Both, Future
High Motion	2	Cycle Past, Both, Future
Hard Motion	3	Cycle Blur and Edge Preserve
Replace	4	Cycle None, Low, and High
Move	5	Toggles Over and Under. SHIFT+5 to Reset
Rotate	6	Toggles Over and Under. SHIFT+6 to Reset
Toggle Color Options	7	SHIFT+7 to Reset all settings
Border	8	Toggles On/Off. SHIFT+8 to Reset
Grain	9	SHIFT+9 to Reset
Transparency	0	SHIFT+0 to Reset
Toggle Rectangle, Lasso, Bezier, Brush.	Q	SHIFT+Q to reverse
Commands		
Quick-fix	D	Automatically draw fix based on preference settings or, if the Paintbrush is enabled, focus on the Brush Size
Quick-fix with Auto-Zoom	SHIFT+D	Automatically draw fix based on preference settings with Auto-Zoom
Toggle Preview	T	Toggle pending fix and original values
Zoom to pending fix	SHIFT+T	Auto-Zooms to pending fix
Accept pending fix manually	G	Accept pending fix and jump to fixed frame if not current
Accept pending fix manually in place	CTRL+G	Accept pending fix and remain on current one
Accept and process marked range	SHIFT+G	Accept and use same settings on marked range
Stop process marked range	CTRL+Spacebar	Stops the processing of the marked range
Reject pending fix	A	
Reset all Overrides	SHIFT+C	Resets all overrides to Default values
Repeat last draw action	~	Automatically repeats last draw action
Get Original Values (GOV)	Use in any tool, however, Get Orig Values applies only to fixes made in DRS™, Scratch, Paint, and Debris	Choose the mode, Rectangle, Lasso, Brush. Right Drag to show the original values. Press T to toggle between the original and fixed pixels. Press G to revert to the original pixels or press A to retain the fix. Press Shift+G to revert a marked range

	Filter	
Retrieve Original Values after last fix	SHIFT+~	Automatically retrieves original values on last fix Use G to accept action on current frame SHIFT+G for marked frame range CTRL+G to accept in place
Toggle History Highlights /Present Values	SHIFT+W	
Toggle Original Values and Present Values	W	
Mouse functions		
Draw fix		Left Drag
Draw for fix with Auto-Zoom - Rectangle only		SHIFT+Left Drag
Force Free Form Lasso while in Rectangle		CTRL+Left Drag
Mouse Wheel		Duplicates function of up//down arrows

Using the Scratch Tool

Note: Scratch maintains a History file of its fixes, therefore these fixes can be returned to their original state (Get Original Values or paint Original Values in the paint tool)



Scratch Window	The area of the tool that magnifies the scratch on all emulsion layers
Boundary Box	The blue rectangle box drawn by the user to determine the search area the tool uses to track the scratch over a marked range of frames.
Limit Markers	Determines the width of the scratch found in the Scratch Window
Magnifier	A red rectangle that appears when a Boundary Box is drawn that magnifies the focused area of the scratch in the Scratch Window

Scratch Tool Operation

1. Establish In and Out marks for processing.
2. Orientation: Is the scratch vertical or horizontal? The direction the Boundary Box is drawn automatically determines its orientation.
3. Density: Is the scratch **Light** or **Dark**? Set the contrast of the scratch to help the algorithm automatically detect the scratch by instructing it to look for light or dark lines.
4. Movement: Is the scratch moving, Yes or No? If yes, you must use the Mark In frame as the reference frame on which to draw the Boundary Box so the tool can track the scratch. The Limit Markers in the **Image** box will be green indicating that the scratch will be tracked. If Yes and you draw the Boundary Box on a frame other than the Mark In the Limit Markers in the Image box will be red, which means that the tool will not be able to properly track the scratch.

Hint: Leave on Yes at all times.

5. Detect: If desired, select the channel to DETECT the scratch..
6. Process: If desired, choose the layers to process (Default is all).
7. On the Player: Use the LEFT mouse button to draw a Boundary Box around the scratch. Use SHIFT while drawing to extend the Boundary Box to the limits of frame.

Hint 1: Draw a box so that only one scratch is included.

*Hint 2: If there is movement, draw the Boundary Box wide and high enough to include the scratch in **all** positions on all frames.*

After drawing the box a red magnifier will appear.

8. Use left-click on the magnifier and drag to position it over the scratch.
Use SHIFT to constrain movement to the vertical axis.
Use CTRL+Click outside the magnifier to jump it to the cursor position.

The Limit Markers of the Scratch Window will react to the new position.

9. To define the limits of the scratch you can:
 - a. Mouse Wheel up or down to determine the width
 - b. ALT + Mouse Wheel to move Limit-Markers left or rightOR
 - c. Use LEFT and RIGHT mouse button clicks on either side of the scratch.
10. Use the Background Detail slider to preserve detail. Higher value retains detail.
11. Preview or Render one or more frames.
 - a. To preview the current frame press D or click the Magnifier button located on the bottom of the tool.
 - i. Press T to toggle the pending fix and the original pixels.
 - b. To preview the marked frame range press SHIFT+D or click on the Magnifier with Brackets button on the bottom of the tool.
 - c. To render a single frame press G or click the Gear button located on the bottom of the tool.
 - d. To render the marked frame range press SHIFT+G or click the Gear with Brackets button located on the bottom of the tool.

- e. To reject a pending fix, press A.

Using the PDL

If you wish to set parameters for marked ranges of the clip but want to process them later, you can use the PDL (Process Decision List).

1. Press CTRL+, (comma) or click Windows/PDL Viewer to open the PDL Viewer
2. Establish mark In and Out points. (press the H key if cuts are on either side of the shot)
3. Set the Bounding box and Limit markers parameters for the marked range
4. To add a shot to the PDL, press the , (comma) key or click the PDL button .
5. When you've added all the events you want to the PDL you can render the PDL by pressing the Render button on the PDL Viewer window.
6. To delete an event from the PDL, click on the event and press the Delete key or click the delete button located at the top of the PDL Viewer
7. If you wish to save the PDL for later use, place focus on the PDL Viewer and press CTRL+S or click the save icon.

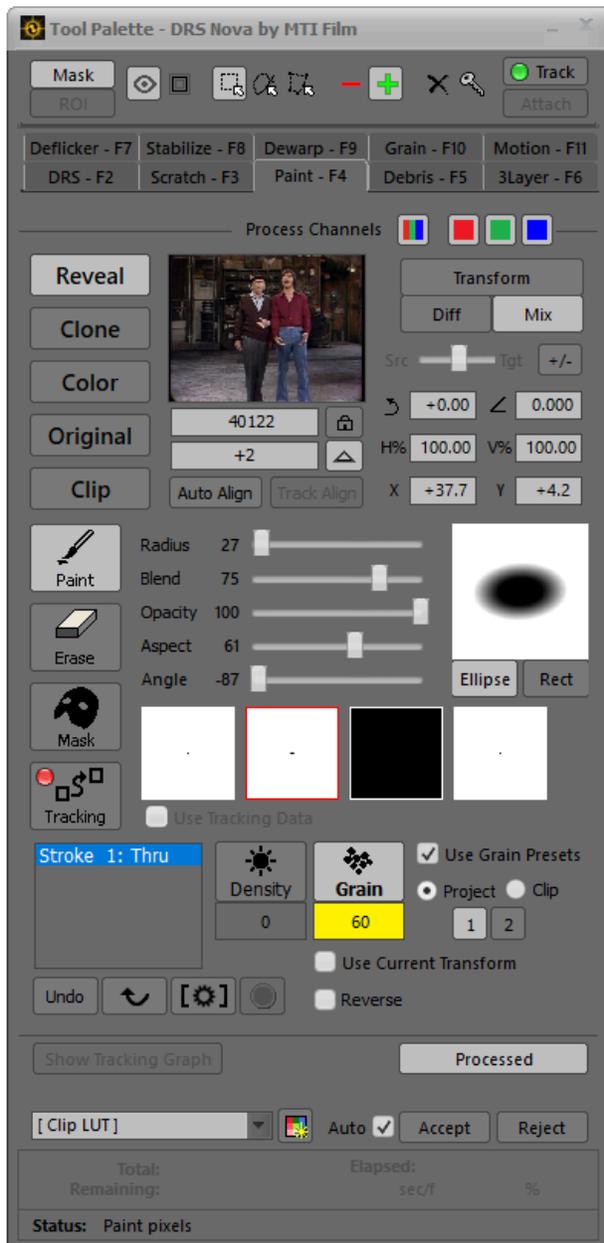
Note: It is not recommended to use the PDL for scratches since each scratch should be corrected with supervision.

Scratch Shortcut Keys

Function	Keys	Note
Density	1	Toggle Density between Light and Dark
Scratch Width	UP/DN Arrows	SHIFT = greater increments, CTRL = less
	Mouse Wheel	Duplicates function of up/down arrows
Scratch Position	LT/RT Arrows	SHIFT = greater increments, CTRL = less
	ALT+Mouse Wheel	Duplicates function of Left/Right arrows
Preview current frame	D	Preview fix on current frame
Toggle Preview	T	Toggle pending fix and original values
Reject pending fix	A	
Preview marked frame range	SHIFT+D	
Render current Frame	G	
Render marked frame range	SHIFT+G	
PDL	. (period)	Add event to PDL (NOT RECOMMENDED)
Show/Hide Boundary Reticles	SHIFT+T	
Pause Render	Spacebar	
Resume Render	Spacebar	
Abort Render	CTRL+Spacebar	
Mouse functions		
Left Mouse Drag		Draw boundary region for fix
SHIFT+Left Mouse Drag		Draw boundary region for fix and automatically extend box to limits of image
Left-click and Drag	On Magnifier	Locates magnifier
CTRL+Left-Click	Within Boundary	Relocates magnifier
Get Original Values (GOV)	Use in any tool, however, Get Orig Values applies only to fixes made in DRS™, Scratch, Paint, and Debris Filter	Choose the mode, Rectangle, Lasso, Brush. Right Drag to show the original values. Press T to toggle between the original and fixed pixels. Press G to revert to the original pixels or press A to retain the fix. Press Shift+G to revert a marked range
Mouse Wheel		Duplicates function of up/down arrows
ALT Mouse Wheel		Duplicates function of Left/Right arrows

Using the Paint Tool

Note: Paint maintains a History file of its fixes, therefore these fixes can be returned to their original state (Get Original Values or paint Original Values) as described in this section.



Modes of Operation

There are five Paint Tool modes:

1. **Reveal.** Allows to paint and “reveal” a Source Frame to the current Target Frame.
2. **Clone.** Allows cloning a portion of a Source Frame to the Target Frame based upon a user defined source “Set Point”. The Source Frame can be the same as the Target or another frame.
3. **Color.** Allows to paint color(s) onto the Target Frame. You can also sample colors in the frame with the Eye Dropper, and “drop” color into an area of the Target Frame with the Paint Bucket.
4. **Original Values.** Allows to paint the original pixels from the frame’s History file.
5. **Alternate Clip.** Allows choosing a different clip to paint to the current clip.

Common Functions for all Paint Modes

Each of the above modes share common processing functions. Where they are different, they will be explained in detail for each mode of operation later in the document.

Selecting a Paintbrush.

- a. Click on the desired brush
- b. Select a brush shape by pressing the Ellipse or Rect(angle) button.
- c. Use the mouse wheel or slider to alter the brush. Use SHIFT for greater increments or CTRL for smaller.
 - i. Radius press D
 - ii. Blend press 8
 - iii. Opacity press 0
 - iv. Aspect press –
 - v. Angle press =

In each case, you can also just click the slider and use the mouse wheel.

Auto Align

Use Auto Align to align objects in the source and target frames automatically

1. Press ALT+Q or SHIFT+5. The cursor will change to a square with target hairs
2. Use the mouse wheel to size the square to include the two objects to align
3. Left-click and the objects will align
4. Release the ALT key, if used, to exit Auto Align

If needed, repeat the steps.

Paint or Erase

1. Paint
 - a. Click the Paint Button
 - b. Left-click on the image and draw your stroke(s)
 - c. Press T to toggle the pending stroke(s) and the original pixels
2. Erase
 - a. Right-click on the image and draw
 - b. To erase using the Left Mouse button, click the Erase button
 - c. Press T to toggle the pending stroke(s) and the original pixels

If no pending strokes are present, a right-click and drag will Get Original Values

Modify the Stroke Set

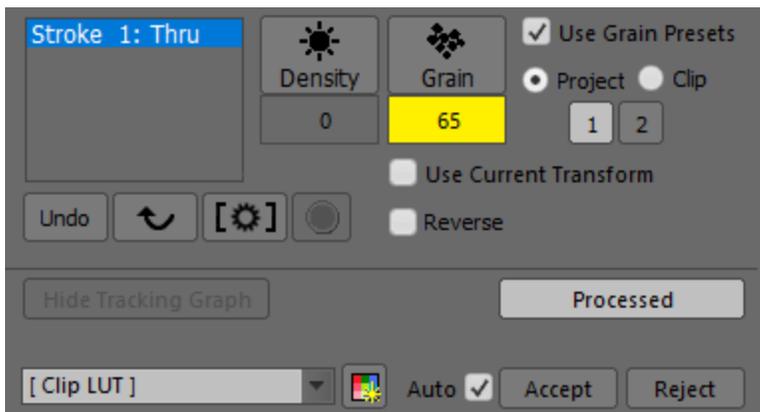
1. Use Density and Grain overrides to modify the stroke set.
 - a. Density – press 7 or click the button. To reset press Shift+C or Shift+7 when enabled or click the yellow value box.
 - b. Grain – press 9 or click the button. To reset press Shift+C or Shift+9 when enabled or click the yellow value box.

Using the Grain Tool's Presets for the Grain Override

The Grain override can be used in two different ways

1. Using the presets established in the Grain Tool
2. Using the “noise” generated by the Paint Tool's grain.

To use the presets, enable the Grain Override button and the “Use Grain Presets” checkbox. Then select whether to use the Project or Clip presets 1 or 2.

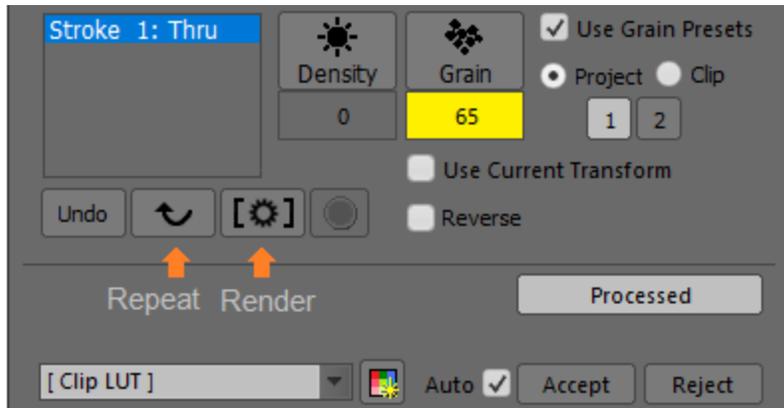


Rejecting or Accepting Pending Strokes

- a. Reject a stroke by pressing the A key or clicking the Undo button
- b. Reject all strokes by pressing SHIFT+A or clicking the Reject button
- c. Accept a stroke set by pressing the G key or clicking the Accept button
- d. Auto-accept. With the Auto-accept checkbox enabled, all pending strokes are accepted when a new stroke is made on a new frame.

Instant Macro

As a stroke-set is made, the Paint Tool automatically records the set into an Instant Macro function that allows you to recall the stroke-set.



- a. To repeat the macro on a single frame,
 - i. press the ~ key or click the macro Arrow button.
- b. To repeat the macro on a marked frame range,
 - i. press the ~ key or click the macro Arrow button
 - ii. press SHIFT+G or press the macro Render button.

Executing paint strokes on any frame within the marked range will render all frames in the marked range when the Render command is invoked.

Use Current Transform

When a paint stroke set is accepted, the paint tool places the complete set of parameters into memory including their transform values. If the set is repeated using the Instant Macro, the stroke(s) will be repeated exactly including the transforms. It can be useful to move/transform the source frame while exactly repeating the paint stroke set, for example, to avoid “brush stroke flutter”. With Use Current Transform, the paint stroke set will be repeated using the current transform values.

Reverse Paint Mode

At times it might be useful to paint in reverse from the Mark Out to the Mark In using the Instant Macro function. To do this:

1. Mark In and Out on the clip
2. Enable the Reverse checkbox located at the bottom of the UI
3. Make a stroke(s) on a frame within the marked range
4. Press SHIFT+G or click the Render Macro button.

Using Masks in the Paint Tool

Unlike other tools that use Masks, which only require that the Mask toolbar be enabled, Paint requires that Mask drawing mode be invoked in order to draw a mask. This is due to the fact that the mouse cursor is used to paint brush strokes and draw Masks. Therefore, in order to draw a mask, the Mask toolbar button and Mask drawing button need to be enabled.

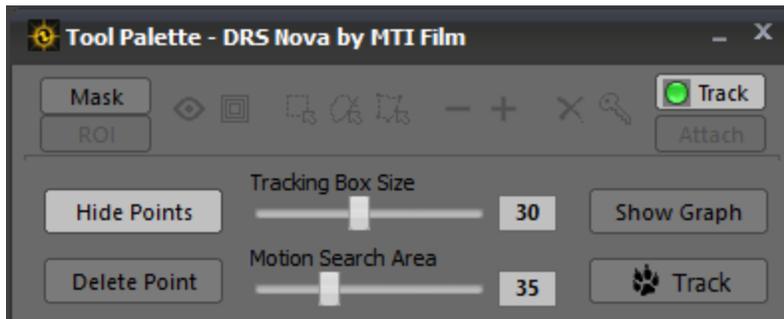
Mask drawing mode can be entered directly when in Reveal, Clone, and Color. Mask mode can also be enabled while in Transform. Click the Mask button to enter the mode.



Tracking

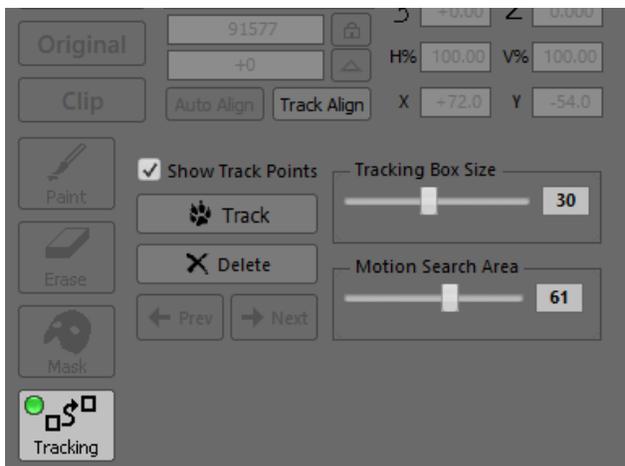
The Paint Tool has two modes of tracking, each with their own tool and purpose:

1. The Mask Tracker found in the Mask tool at the top of the UI is used to track an object in order to attach a mask to the tracking point and have it follow the tracking path.



Once the Track button is enabled, the tracking properties box will “slide” out to expose the additional tool buttons and sliders.

*Note: It is recommended to read more about masks in the following section: [Mask Tool](#)
Additional reading to help with tracking can be found here: [Steps for Manual Stabilization](#)*



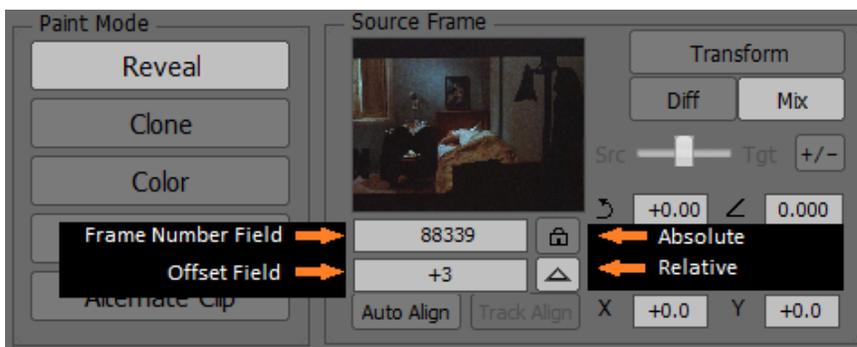
2. The Paintbrush Tracker is exposed by enabling the Tracking button in the body of the UI. It is used for tracking an object in order to attach the brush to the tracking point. When enabled, the Paintbrush Panel is replaced with the Tracker Panel.

The Paintbrush Tracking tool allows you to track an object(s) in a shot and align that object to previous or succeeding frames based upon the established source frame offset. For example, if you have a 100 frame shot and establish a source frame offset of +3 frames, the tracker will automatically track 3 additional source frames after the Mark Out frame, which, in this case, would be frame 97 in order to stay within the same shot. Conversely, if the offset is -3 frames, it will automatically track 3 frames before the Mark In, which, in this case, would be frame 4 in order to use frames 1-3 as the offset frames.

If the Offset is +0 then the whole shot can be tracked. This is useful for Clone painting where source frame offsets are not normally required.

Setting up Tracking for a Shot:

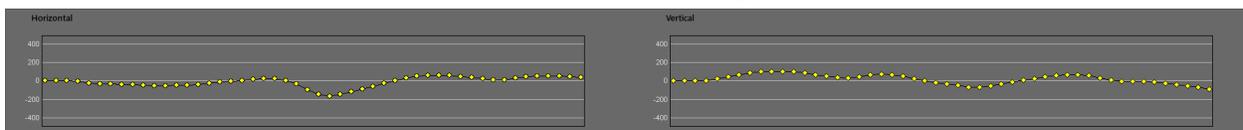
1. **Mark the In and Out frames of the shot.**
2. **Choose a Source Frame Offset.** There are 3 ways to select your Source Frame offset:
 - a. Hold down CTRL+SHIFT and use the S and F keys to step. (recommended)
 - b. Type the frame number into the Source Frame's Frame Number field.
 - c. Type an Offset in + or - frames in the Source Frame "Offset" field.
2. **Determine whether the Source Frame is Absolute or Relative.** If you use Absolute mode, the Source Frame always remains **fixed** no matter the Target Frame. If you choose Relative mode, the Source Frame **moves** in sync with the Target Frame as determined by the Source Frame Offset.



Absolute mode:
Click the Lock button by the Frame Number field

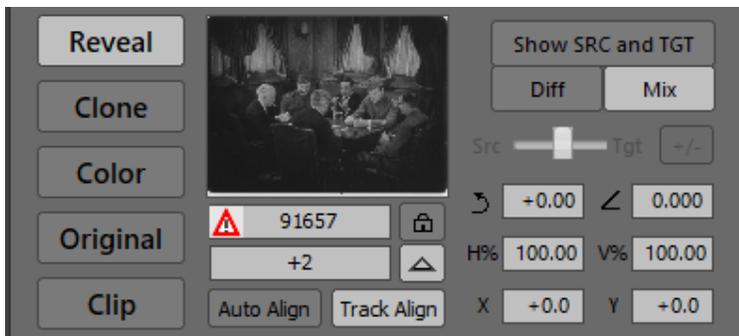
Relative mode:
Click the Triangle button by the Offset field.

3. **Enable the Tracking mode.** Click the Tracking button. The tracking graph will be shown at the top of the frame. To hide the graph, click the Hide Tracking Graph button at the bottom of the UI. To show it, click the button again.



Size it by clicking on the blue "splitter" at the bottom of the graph and moving it up or down.

4. **Place a tracking point(s).** Choose an object within the frame that has a relatively sharp edge that can be tracked.
5. **Adjust the Box Size.** Encompass as much of the object as is necessary to effect a good track.
6. **Adjust the Search Area.** Depending on the amount of motion, you may have to increase or decrease the search area. The larger the search area, the longer the analysis between frames.
7. **Enable the Track.** Press the T key, or press Ctrl+G, or click the Track button. Once the track is complete, the LED on the tracking button will turn green.
8. **Enable the Track Align button.** This will align the tracked object of the source frames to the target frames.
9. **Paint.** Choose a brush and adjust brush parameters as required.

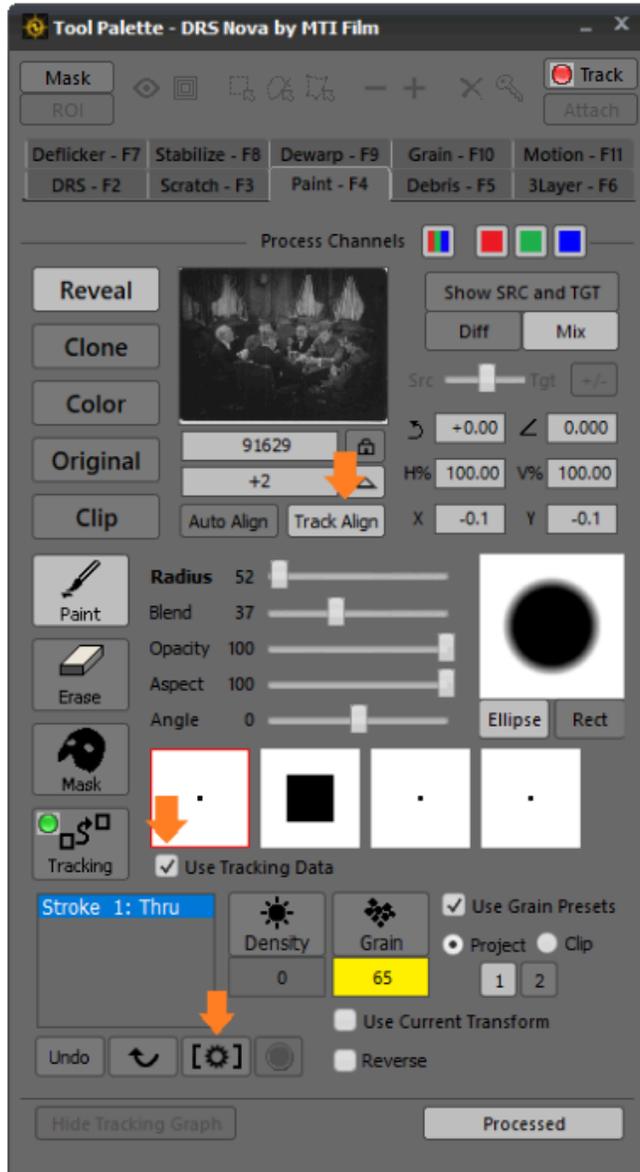


If the Warning icon is visible in the Frame Number field then the current frame in the player is out of range of tracked frames. Only paint when this warning indicator is off.

In Clone Mode, since the Source Frame is generally the same as the Target Frame, and as long as the paint stroke(s) is within the marked range, the warning icon will not show.

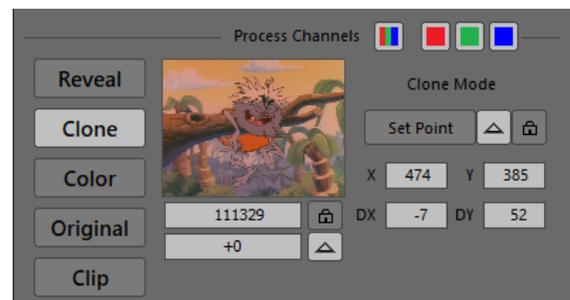
Use Tracking Data

The Use Tracking Data option provides a method to have a paint stroke follow the tracking of an object. It can be used in all Paint modes.



After tracking and enabling Track Align and Use Tracking Data, the data can be used to automatically have the paint stroke(s) follow the tracked object by pressing SHIFT+G or clicking the Render Macro button.

In Clone mode, while DRS™Nova allows for a frame offset to be set, it is not recommended or useful when Use Tracking Data is enabled. In Clone mode, the proper use of Use Tracking Data is to set the Offset Field to 0, track an object and then use the data to force the paint stroke(s) to follow the object within the same frame. Press CTRL+SHIFT+SPACEBAR to set the Offset Field to zero (0)



Reveal

(press 1 or click on the Reveal button)

Choosing a Source Frame

There are 3 ways to select your Source Frame

1. Hold down CTRL+SHIFT and use the S and F keys to step. (recommended)
2. Type the frame number into the Source Frame's Frame Number field.
3. Type an Offset (in + or - frames) in the Source Frame's Offset field.

Note: Press CTRL+SHIFT+SPACEBAR to set the Offset Field to zero (0).

Determining whether the Source Frame is Absolute or Relative

If you use Absolute mode, the Source Frame remains **fixed** no matter the Target Frame. If you choose Relative mode, the Source Frame **moves** in relation to your Target Frame as determined by the Source Frame Offset.

Absolute mode - Click the Lock button next to the Frame Number Field.

Relative mode - Click the Triangle button next to the Offset Field.

Transform the Source Frame. You may wish to alter the Source Frame in order to align it to the Target Frame. There are two Transform modes:

1. **Full Transform** mode provides the ability to change the geometry of the Source Frame in addition to moving it on X, Y, and Z axes.
2. **Quick Transform** mode provides movement of the Source Frame on X and Y axes only.

Enter **Full Transform** mode by pressing the 5 key or clicking the Transform button.

1. Determine whether you wish to see a Difference (onion skin) or Mix of the combined images. Press the 6 key, or click the Diff or Mix buttons.
2. When in Full Transform, use the Transform Box to alter the Source Frame.
 - a. Click on one of the vertices of the Transform Box and move it as desired.
 - b. Hold the SHIFT key down and use a corner vertex to maintain the aspect ratio during a resize.
 - c. Click in the box to move the Source Frame on X and Y axes or use the arrow keys.
 - d. Click outside the box to rotate the Source Frame on its Z axis.
 - e. Press CTRL+SHIFT+C to reset all axes to default.

Enter the **Quick Transform** mode by pressing and holding down the ALT key. Left-click and drag the image to move the Source frame on the X and Y axes.

Clone Mode

(press 2 or click on the Clone button)

Choosing a Source Frame

There are 3 ways to select your Source Frame

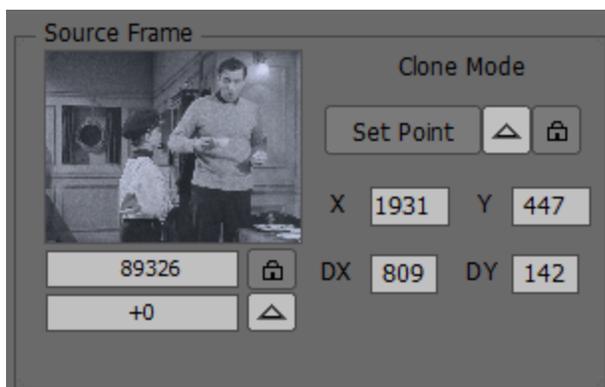
1. Hold down CTRL+SHIFT and use the S and F keys to step. (recommended)
2. Type the frame number into the Source Frame's Frame Number field.
3. Type an Offset (in + or - frames) in the Source Frame's Offset field.

Note: Using the same frame as a source is the general practice in Clone.

Press CTRL+SHIFT+SPACEBAR to set the Offset Field to zero (0).

Determining whether the Set Point is Relative or Absolute.

If you choose Relative mode, the Set Point follows relative to the clone brush. If you use Absolute mode, the clone Set Point always remains **fixed** no matter the position of the brush stroke.



Relative mode:

Click the Triangle icon next to the Set Point button

Absolute mode:

Click the Lock icon button next to the Set Point button

The X and Y values represent the location of the Set Point.

The DX and DY values represent the location of the clone brush in relation to the Set Point.

Choosing the Clone Set Point.

There are two ways to create the clone Set Point.

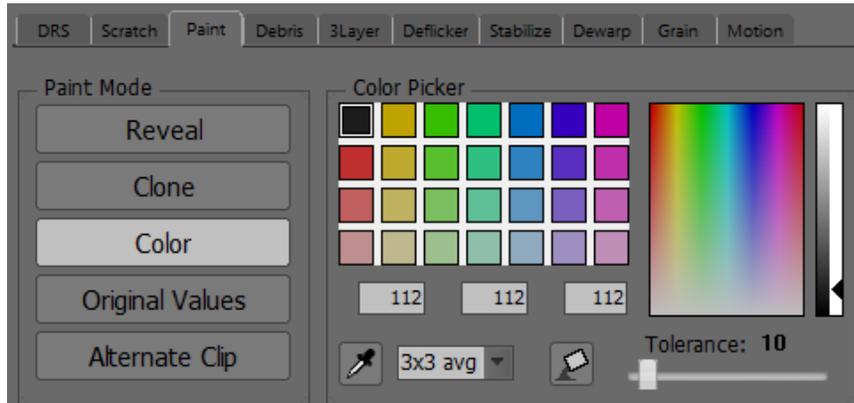
1. Press and hold down CTRL+SHIFT and then left-click on the image to create the clone source Set Point (shown in red).
 - a. Release the CTRL+SHIFT keys, move the mouse and left-click on the image to enable the green cloning brush and make the first brush stroke.
2. While holding down CTRL+SHIFT, left-click on the player window and move the mouse. The red Set Point will move with the mouse movement.
 - a. Release the CTRL+SHIFT keys, move the mouse and left-click on the image to enable the green cloning brush and make the first brush stroke.

Color Mode

(press 3 or click on the Color button)

Picking a color from the color palette

Pick a color from the color palette by clicking in any color box or clicking on a color in the color gradient box. The luminance can be changed by clicking and moving the black triangle slider.



Using the Eye Dropper

The Eye Dropper allows you to choose a color from the image located in the Player Window. Press and hold down CTRL+SHIFT to turn the brush into an Eye Dropper or click on the Eye Dropper button.

1. Choose a color box
2. Click on the desired color in the Player Window image. The color box will inherit the color.
3. Paint the color onto the image. The brush properties can affect the color strokes as needed.
 - a. Press T to toggle the pending stroke(s) and the original image.

Using the Bucket

The Bucket allows you to “drop” color onto the image in the Player Window.

1. To enter the Bucket mode, press the Alt key once (do not hold it down) or click on the Bucket button.
2. Click on the image.
3. Adjust the Tolerance slider to affect the number of pixels affected.
4. Click on the image again if needed after adjusting the Tolerance.
5. Press Alt again to exit Bucket mode.
 - a. Press T to toggle the pending stroke(s) and the original image.

Original Values Mode

Press 4 to toggle between Original Values & Alternate Clip or click the Original Values button

Original Values allows you to paint the pixels located in the History file back to the frame using the brush and all its properties. It does not remove the History but, in fact, adds to it.

There are three different views that allow you to see the pixels saved in the History file:

1. As blue boxes or “blobs” - Press the SHIFT+W or W (see Note1). This view does not allow for painting, just viewing.
2. As magenta blobs - Press CTRL+W. In this mode you can paint through the magenta blobs revealing the original values.
3. As the original values - Press the W key or SHIFT+W. In this mode you can paint the original values back to the current frame.

In all cases, after making the desired number of brush strokes, press T to toggle the pending stroke(s) and the original image.

Note1: Depending on how the checkbox is set on the General Tab in the File menu “Preferences” determines the behavior of the W key.

Note2: Be aware that painting original values does replace the painted pixels with those saved in the History file, but it does not eliminate the blue History outlines or blobs.

Get Original Values (GOV)

If there are no Pending Strokes present, a right-click and drag will GOV. Once a GOV is complete, you can repeat it by pressing the SHIFT+ ~ key

NOTE: This is different from the other tools where repeating a GOV is done by just pressing the ~ key. The reason for this is that pressing the ~ key on its own will always repeat the last accepted paint stroke(s) macro.

For a more detailed explanation of History and GOV, see:

[Understanding History Files and GOV.](#)

Alternate Clip Mode

(press 4 to toggle between Original Values & Alternate Clip or click on the Alternate Clip button)

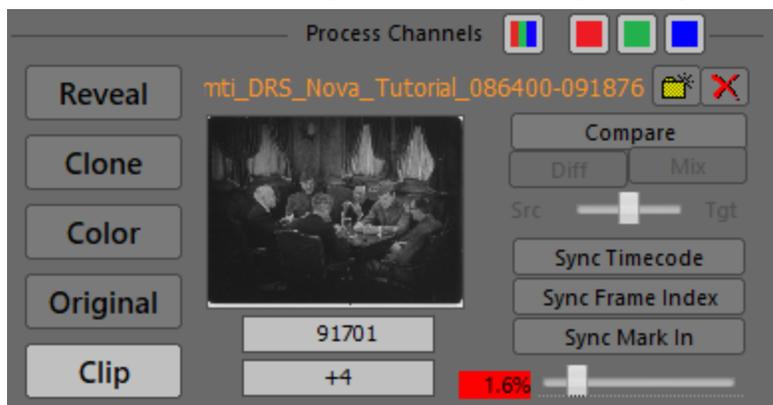
Alternate Clip allows you to paint from one clip to another using the brush and all its properties. This mode is useful when painting:

1. From a clip that is not derived from the Master clip
2. From one Master clip to another Master clip
3. From the Master clip a the version
4. From a version to another version
5. From a clip processed by 3rd party software

DRS™NOVA analyzes the two clips and produces a red “difference matte”.

To load an Alternate Clip:

1. First load the clip you wish to use as your target for painting.



2. Click the yellow folder button
 - a. The Project Manager window will open
 - b. Load the source clip from which you wish to paint
 - c. The name of the alternate clip will appear above the proxy monitor

DRS™NOVA will automatically attempt to synchronize the two clips based upon frame number or timecode, but you can also use:

1. Sync Frame Index. This will use the first frame of each clip for sync reference points
2. Sync Mark In. This will use the Mark In of each clip for sync reference points. If no Mark In exists on the source clip, the first frame will be used.

Paint Shortcut Keys

Function	Keys	Note
Choose Source Frame	CTRL+SHIFT	Hold down CTRL+SHIFT and then press S or F
Reveal Mode	1	
Set Source Frame = Target Frame	CTRL+SHIFT+Spacebar	This sets the Offset field to +0
View Source Frame	CTRL+SHIFT	Or Press and hold Mouse Wheel
Clone Mode	2	
Clone Mode – Choose Set Point	CTRL+SHIFT+Click	
Color Mode	3	
Color Mode – Color Picker	CTRL+SHIFT+Click	
Color Mode – Paint Bucket	ALT+Click	Press ALT once and do not hold down
Original Values Mode	4	4 key toggles between Original Values and Alternate Clip
Alternate Clip	4	
Mask Mode	Click Mask Button	
Quick Transform (QT)	ALT+Click & Drag	Drag source image for X and Y positioning or use arrow keys
Full Transform (FT)	5 or CTRL+T	Transform X, Y, and Z positioning of Source Frame
FT: Position X and Y	Click & Drag	Click inside yellow transform control box or use arrow keys
FT: Rotate	Click & Drag	Click outside the transform control box or use arrow keys
FT: Stretch	Click & Drag	Click any of the 8 transform points
FT: Skew	CTRL+Click & Drag	Click any of the 8 transform points
FT: Scale without retaining aspect	Click & Drag	Click any of the 4 corner transform points
FT: Scale with retaining aspect	SHIFT+Click & Drag	SHIFT+Click any of the 4 corner transform points
FT: Accept Transform	5, or CTRL+T or Enter	Saves parameters and exits FTM
FT: Reject Transform	Esc	Exits FTM without saving parameter changes
Reset Transforms	CTRL+SHIFT+C	Resets all transform parameters to 0 or default
Transform Visibility	6	Toggles between Difference and Mix

Tracking Mode	Click Tracking Button	
Track Object	T or CTRL+G	When in Tracking mode, T key will track point(s)
Track Align	Click Track Align Button	Aligns the Source and Target frames on X and Y axes based upon tracked object
Auto Align	ALT+Q+Click	Enables alignment reticle to align object found in both Source and Target frames
Auto Align shortcut from FT	SHIFT+5	Goes directly to Auto Align via FT
Radius	D	Use mouse wheel, arrow keys, or slider to adjust
Hide Brush	Hold D	Hold the D key down to hide brush
Density	7	Change density of brush strokes using mouse wheel, arrow keys or slider to adjust
Reset Density	SHIFT+7	Or click the value box under the button
Blend	8	Use mouse wheel, arrow keys, or slider to adjust
Grain	9	Add Grain to brush strokes. Use mouse wheel, arrow keys, or slider to adjust
Reset Grain	SHIFT+9	Or click the value box under the button
Reset Density and Grain	SHIFT+C	Resets enabled Density or Grain to default
Opacity	0	Change opacity of brush stroke. Use mouse wheel, arrow keys, or slider to adjust
Aspect	-	Change aspect of brush stroke. Use mouse wheel, arrow keys, or slider to adjust
Angle	=	Change angle of brush stroke. Use mouse wheel, arrow keys, or slider to adjust
Select Brush	Click on Brush	
Undo last stroke	A	
Reject all strokes	SHIFT+A	
Commands		
Toggle pending stroke(s) and original	T	
Accept manually	G	Accept pending fix and jump to fixed frame if not current
Accept in place	CTRL+G	Accept pending fix on current frame when not on pending one
Accept and render marked range	SHIFT+G	

Repeat last action	~	Repeats last stroke(s) or GOV action
Repeat last action and render range	~+SHIFT+G	Repeats last stroke(s) or GOV action and renders marked range
Abort Render	CTRL+Spacebar	
Mouse functions		
Get Original Values (GOV)	Use in any tool, however, Get Orig Values applies only to fixes made in DRS™, Scratch, Paint, and Debris Filter	Choose the mode, Rectangle, Lasso, Brush. Right Drag to show the original values. Press T to toggle between the original and fixed pixels. Press G to revert to the original pixels or press A to retain the fix. Press Shift+G to revert a marked range
Mouse Wheel		Adjust focused slider
Mouse Wheel in Transform	Up and Down	Moves Source Frame up and down – use SHIFT for greater increments, CTRL for less
Mouse Wheel in Transform	ALT	Moves Source Frame left and right – use SHIFT for greater increments, CTRL for less

Auto-Accept is always functional when enabled. Any subsequent stroke on a new frame will accept the pending stroke(s).

Use G to accept stroke(s) on current frame

SHIFT+G to accept stroke(s) for the marked frame range

CTRL+G to accept pending stroke(s) on a frame that is not the current one

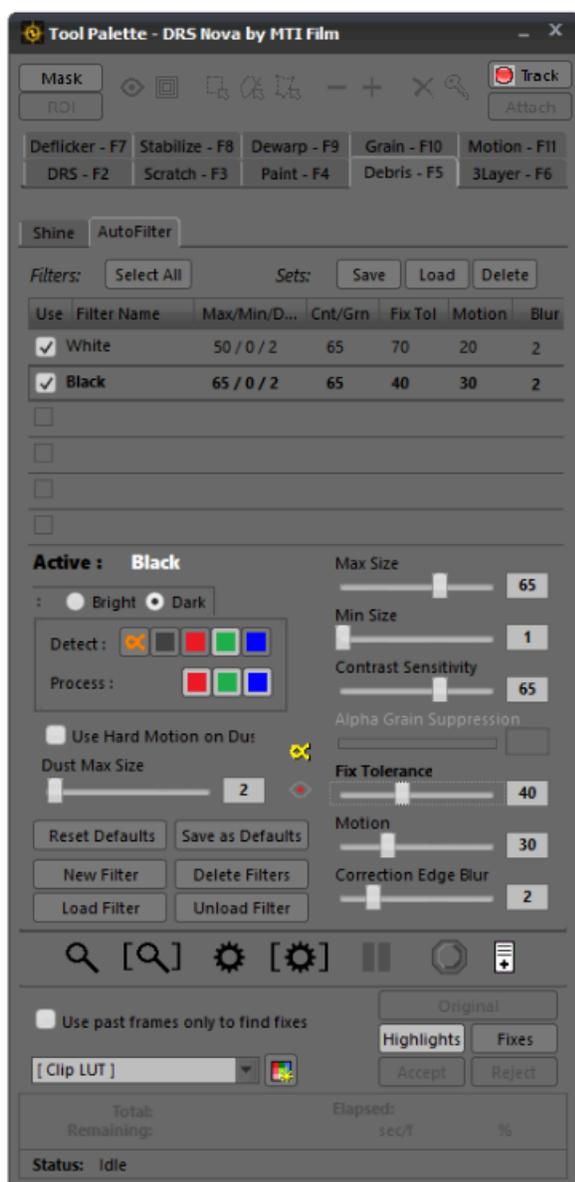
Use SHIFT for greater increments, CTRL for less on all sliders when using mouse or arrow keys

Using the Debris Filter Tools

The Debris Filter is a flexible and powerful tool for identifying and removing different types of debris. There are a number of parameters that impact the effectiveness of the tools designed to assist in identifying particular types of debris.

There are two Debris Filters, AutoFilter and Shine. Shine is a more computationally intensive filter and, therefore, will be somewhat slower but more discerning.

Using AutoFilter



While the Debris Filters are automated tools, the better they are understood the better the result. For the automation to work, it must be able to discern when an object (dirt and fleeting scratches - “Debris”) in the frame is foreign to the original photography. To do this properly, Debris Filters must analyze every frame and compare them to their surrounding neighbors. Along with the settings assigned to the various parameters, the results can assist in reducing the number of hours spent manually picking dirt.

ROI Mode

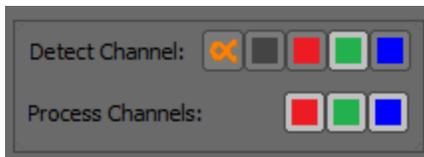
The use of ROI mode (Region of Interest) in Debris Filters can facilitate dirt cleanup on a frame by frame basis. For example when in ROI Mode, a Left-click/drag drawn region serves as a quick way to surround several pieces of debris at once and replace only the pixels required to eliminate the offending dirt. If the Mask Tool is enabled, enter ROI mode by pressing SHIFT+Q or click the ROI button on the Tool Palette. If the Mask Tool is **not enabled**, drawing on the image will automatically enable it. Since both Debris Filters maintain History files of their fixes, these fixes can be returned to their original state (Get Original Values) using a Right-click/drag over the area you wish to retrieve or using the Paint Tool's Original Values mode.

AutoFilter - Filter Sets

A Filter Set is a group of filters that are designed to work together.

Use the 'Load' button in the upper-right next to the "Sets:" drop down field to choose a filter set. By default, there are three Filter Sets.

1. Normal: For White and Black Debris
 - a. **White**
 - Debris Contrast: **Bright**
 - Detect: Green Channel
 - Process: All Channels
 - b. **Black**
 - Debris Contrast: **Dark**
 - Detect: Green Channel
 - Process: All Channels



(Note: The green channel is set by default to detect dirt since it generally has the strongest signal. An alternate choice would be the luminance channel shown as a gray button)

2. 3 layer Separation. To find debris on individual color channels.

Bright Debris	Dark Debris
<p>Red</p> <ul style="list-style-type: none"> - Debris Contrast: Bright - Detect: Red Channel - Process: All Channels 	<p>Red</p> <ul style="list-style-type: none"> - Debris Contrast: Dark - Detect: Red Channel - Process: All Channels
<p>Green</p> <ul style="list-style-type: none"> - Debris Contrast: Bright - Detect: Green Channel - Process: All Channels 	<p>Green</p> <ul style="list-style-type: none"> - Debris Contrast: Dark - Detect: Green Channel - Process: All Channels
<p>Blue</p> <ul style="list-style-type: none"> - Debris Contrast: Bright - Detect: Blue Channel - Process: All Channels 	<p>Blue</p> <ul style="list-style-type: none"> - Debris Contrast: Dark - Detect: Blue Channel - Process: All Channels

Note: For 3 layer filters, each detects on a single channel, but the default setting processes all channels to account for any cross-channel bleed, however, you can try processing only the affected channels.

3. AlphaFilter. This filter allows for using the Alpha Channel to determine where corrections are to be applied to the image. This requires that the source file contains an embedded Alpha Channel produced at the film scanner.
 - a. **Alpha**
 - Debris Contrast: n/a
 - Detect: **Alpha Channel**
 - Process: All Channels

Parameters

Parameters are set for each filter separately or together if multiple filters are selected. In order to adjust parameters, you must click on a filter found in the Filters box. You may select multiple filters using CTRL+Click and SHIFT+Click. The Highlighted filters are displayed with bold text with a dark border. Below, in the Parameters area, you will find a variety of filter adjustments. Experiment with the parameters of each slider to determine their best use for the debris you wish to detect.

1. Max Size. Use the slider to determine the maximum size of debris you wish to identify with the selected filter. Only debris smaller than the Max Size will be processed.

2. **Min Size.** Use the slider to determine the minimum size of debris you wish to identify with the selected filter. Only debris larger than the Min Size will be processed.
3. *Luminance Threshold.* This slider only applies to files containing an embedded Alpha Channel. At the highest setting, all luminance values found in the file are passed through for correction.
4. **Contrast Sensitivity.** Determines the least amount of contrast the debris must have in comparison to the surrounding image in order to be detected by the filter. Higher numbers will detect more debris.
5. *Alpha Grain Suppression.* This slider only applies to files containing an embedded Alpha Channel. Most effectively used to suppress the amount of grain that the scanner includes in its bitmap.
6. **Fix Tolerance.** Potential fixes for detected debris, according to the size and contrast parameters, are evaluated and must be under the Fix Tolerance threshold in order to be applied. Higher numbers for this parameter are more aggressive as the tool will be more flexible in the replacements it allows.
7. **Motion.** Determines the search area (as a percentage of the frame) that the filter will use to find a suitable replacement for the fix.

Motion Hint: Use a low setting (5) for animation shot on twos, and a higher setting for live action.

8. **Correction Edge Blur.** Determines how much the fix will “grow” in order to blur the edges.
9. **Dust Max Size.** This determines the maximum size of debris to be classified as dust. All 'dust' is processed, regardless of whether the fix quality meets the minimum fix tolerance.
10. **Use Hard Motion on Dust.** Like the DRS Hard Motion option, a spatial blur will be applied to any debris qualifying as Dust. This is useful in circumstances where there is extreme motion.
11. **Use past frames to compute fixes.** Very useful for fixing small sized dirt found on animation cells that were shot on “2s”. Since the general algorithm of Debris Filter looks forward and back to assess whether an object is dirt, this mode forces the algorithm to look back only.

Example Usage

Processing Debris Filter on a complete shot or section of shot:

1. Review the shot to see if it should be Debris Filtered. Shots with lots of similar debris and without too much motion are good shots to start with.
2. Stop on a frame that has some debris that you can see easily.
3. Choose your filter(s). If you have a good sense of what your settings should be, set some reasonable starting point. Otherwise, be aggressive with size, contrast sensitivity and fix tolerance (ex. 70, 80, 80 respectively).
4. Press 'D' to preview those settings on that frame.
Note: Each subsequent adjustment of parameters requires pressing D again.
5. Review the detections by toggling the highlight display with the T key:

If not enough is being detected:

- Small, faint dirt is not being detected: Increase Contrast Sensitivity
- Small, bright dirt is not being detected: Increase Fix Tolerance
- Large debris is not being detected: Increase Max Size

If too much is being detected:

- Grain is being identified as dirt: Decrease Contrast Sensitivity
- Large features are being detected as dirt: Decrease Max Size
- Small moving features are detected: Decrease Fix Tolerance

6. Review the corrections by toggling the fixes with the SHIFT+T keys:
 - Fixes do not look right: Increase Motion settings
 - Fixes still do not look right: Decrease Fix Tolerance
7. Once the settings are calibrated on one frame, click 'SHIFT+D' to preview the settings between the marks.
8. Make further adjustments to the settings if necessary. Or you can add a mask to exclude any areas more prone to artifacts. Finally, sometimes different sections of a shot will have different optimal settings, so processing the shot in sections may prove to be most efficient.
9. When you are satisfied with the preview, click 'SHIFT+G' to render the marked range.

Quick Review and Further Notes:

Use a single frame to calibrate your initial settings (press D). Any additional adjustments to the settings must be followed by pressing D again to refresh the processing.

Preview the whole shot and make further adjustments to settings (press SHIFT+D)

Use the Mask tool to exclude or include particular areas

Process shots in sections if settings do not 'hold' through the shot

It can be easier to undo a few artifacts than to find the perfect settings. Use Right-click & Drag to Get Original Values (GOV)

Processing Debris Filter on Single Frames

Debris Filters can also be used on a frame at a time. Follow the steps as defined above, but try using slightly more aggressive parameters in combination with **ROI** (Region of Interest) mode.

1. Go to a frame with debris
2. Draw a ROI region around the area to process using the rectangle shape.
3. A preview will automatically be processed. Click G to render the single frame or A to reject.
4. Adjust parameters (see 5-6 above) and then press D to refresh the processing.
5. Click G to render the single frame or A to reject.
6. Drawing a new region will automatically accept and render the previous region.

Using Mask in Debris Filter

1. Enable the Mask tool if it is not enabled (SHIFT+I)
2. Choose the style of drawing tool. Press Q repeatedly to cycle through the drawing tools or click on the desired one.
3. Choose whether Mask is Inclusive (green) or Exclusive (red). Press the i key to toggle between polarities or click on the green + or red – buttons.
4. Draw on the image. Left+Click and drag to draw. For Bezier, Left+Click to place individual points and join the last to the first.

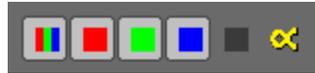
Note: The Mask and ROI tools are mutually exclusive. If one is operational, the other is not.

Using the Alpha Filter

If an Alpha Filter is present in the selected clip, a yellow icon button located in the lower right of the UI will be enabled.

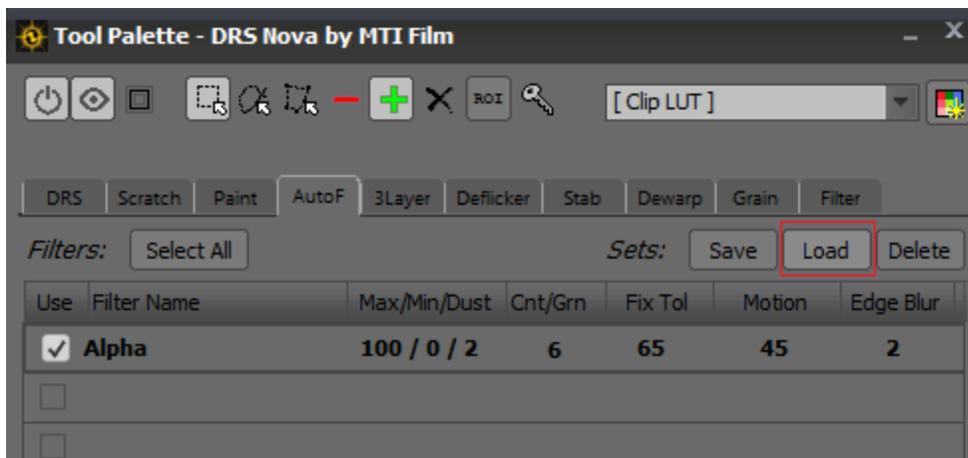


No Alpha Filter present ^

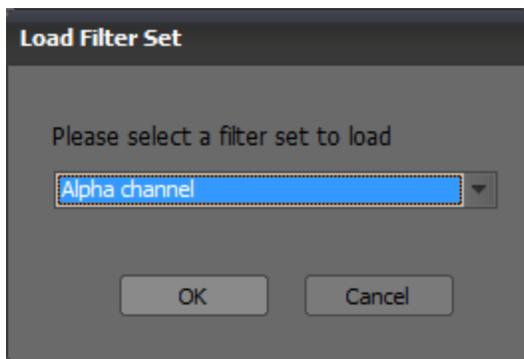


Alpha Filter present ^

Clicking on the Alpha button will display the result of the Alpha Channel's unfiltered full capture. While in this state, the tool has no effect; it is only intended to display the unfiltered alpha. In order to affect the image, use the following steps:



1. Load the Alpha Filter. In the upper right of the tool, click the Load button.



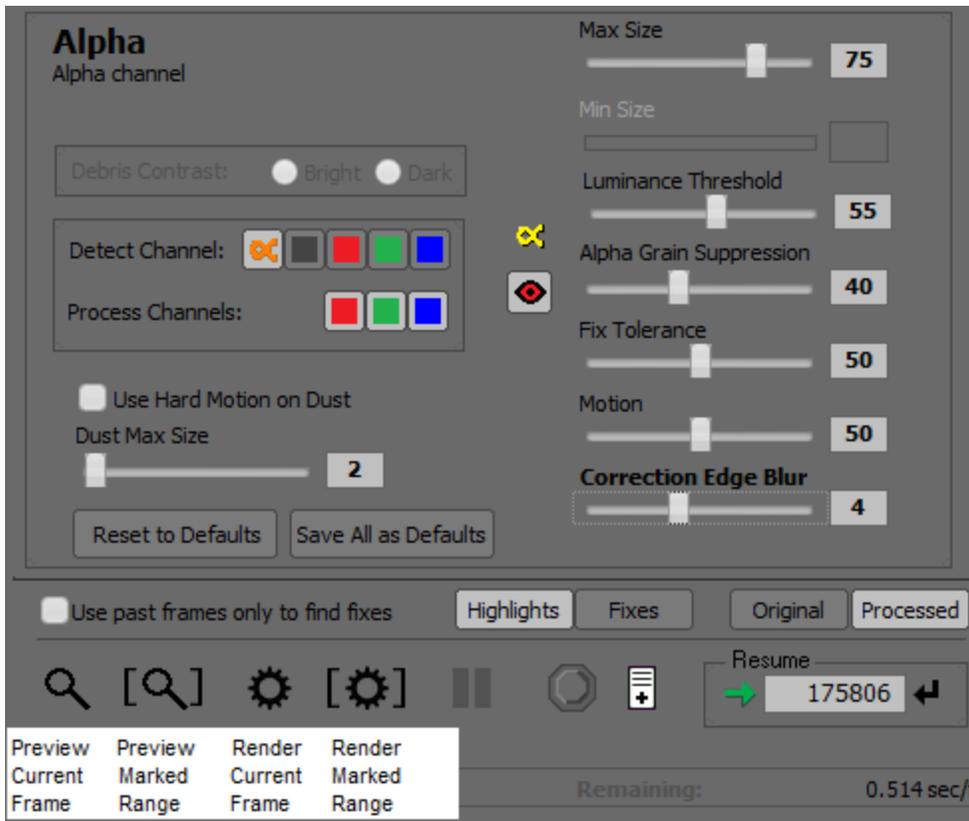
Choose "Alpha channel" and click OK.

2. Use the Luminance Threshold slider to determine the degree of debris luminance intensity the filter will pass for processing. The higher the setting processes more debris.

3. Click the red Grain Suppression button or press Ctrl+T to display the result of adjusting the Alpha Grain Suppression slider. The slider will set the threshold for the amount of grain allowed to be processed as dirt so use the slider to properly discriminate between grain and legitimate debris. All debris that passes the grain suppression threshold will be displayed in Red.



4. Use the Fix Tolerance slider to determine the amount of “forgiveness” the tool will allow for replacements. The higher the value, the more forgiving the tool will be of fix-replacements. Changes in the Fix Tolerance will be displayed dynamically if the red Alpha Grain Suppression button is enabled.
5. To expand the search area and possibly improve the nature of a fix, use the Motion slider to increase the search for a suitable replacement.
6. Press Shift+T to toggle which of the two views you want to display for the preview, either the green Highlights and the Current Values or the Fixes and the Current Values.
 - a. Click the Preview button or press the D key to preview the current frame.
 - i. While located on a frame, press the T button to toggle between the two states
 - b. Click the Preview Marked Range button or press Shift+D to preview a marked range.
 - c. Click the Render button or press G to render the current frame.
 - d. Click the Render Marked Range button or press Shift+G to render the marked range.



Note: While previewing the current frame with the Red Grain Suppression view enabled, adjusting the sliders will either increase or decrease the amount of potential fixes and, therefore, will either increase or decrease the number of Red indicators.

Using a PDL (Process Decision List)

If you wish to set parameters for marked ranges of the clip but want to process them later, you can use the PDL.

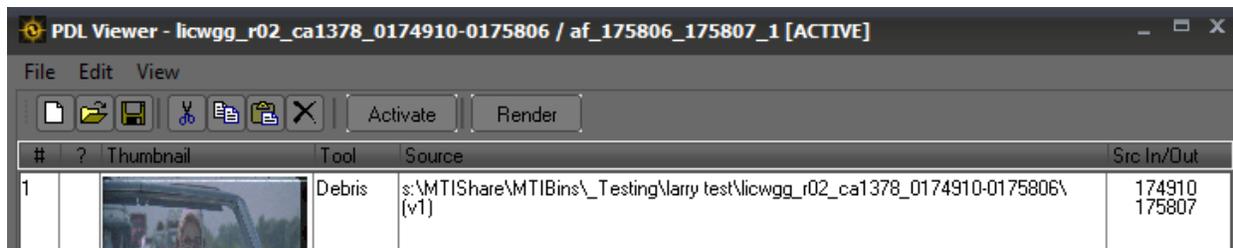
1. Establish Mark In and Out points
 - a. You can add one shot at a time to the PDL
 - i. Mark In and Mark Out on a shot (press the H key if there are cuts on either side of the shot)
 - ii. Press the , (comma) key or click the PDL button at the bottom of the UI



- b. You can add all shots found in the clip to the PDL, after cut detection has been run and validated, by pressing SHIFT+, (comma) or pressing SHIFT+ Click the PDL button.

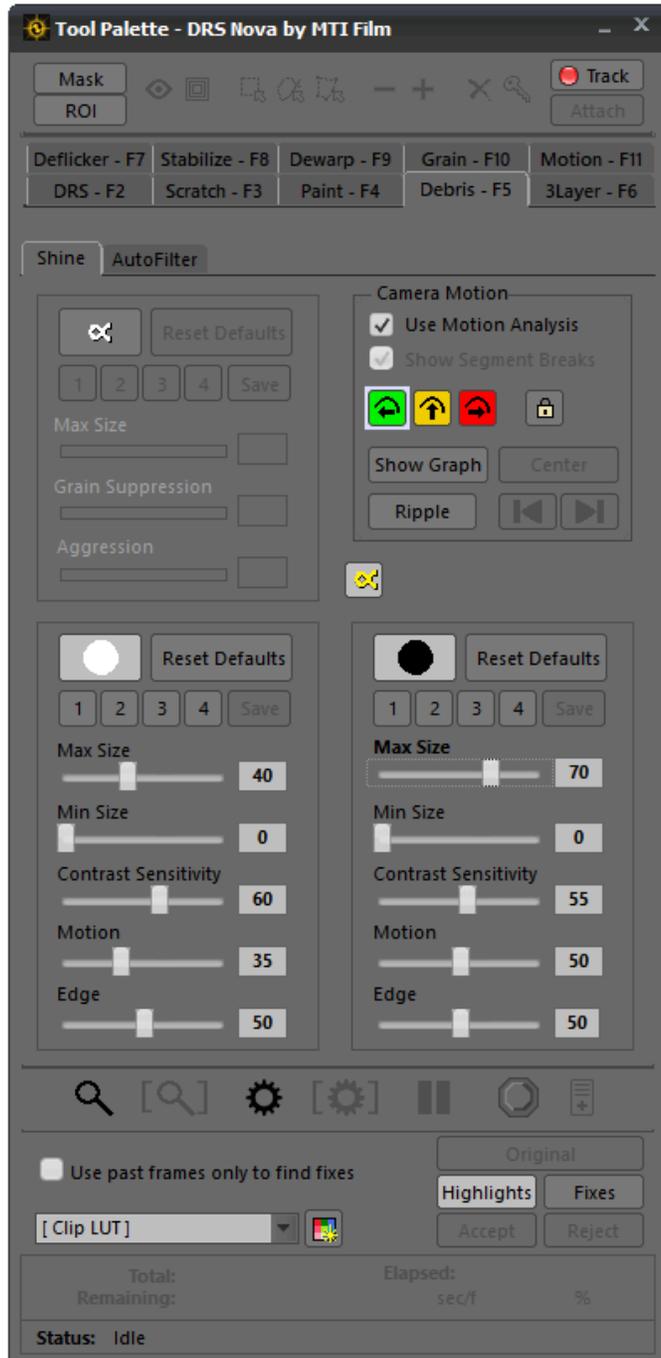
Note: Adding all shots at once to a PDL in the Debris Filters is not recommended since one set of parameters do not normally apply to all shots.

2. When all events have been added to the PDL, render the PDL by pressing the Render button on the PDL Viewer window.
3. You can also save the PDL for later use or for safety. To save the PDL, place focus on the PDL Viewer and press CTRL+S or click the save icon.



Using Shine

Shine is the latest MTI development in automated dirt and fleeting scratch repair. It works differently from AutoFilter in that it has fewer controls and a more powerful and discriminating detection algorithm.



Max Size

If the motion of a shot is too great, a lower value setting is best in order to avoid fast motion variables.

Min Size

A high value ignores small debris.

Contrast Sensitivity

Use Contrast Sensitivity to find the most amount of dirt that can be detected without introducing false positives. Try a lower setting to start combined with a higher Motion setting.

Motion

This function is designed to measure the quality of fixes. The higher the setting, the more debris will be detected depending on the Contrast Sensitivity setting. It is recommended that this function start at a lower value and increase with previewing.

Edge

Use the edge function to reduce the incidence of false detections due to shadows around edges of objects and people.

Shine Alpha Filter

The Shine Alpha Filter produces a high quality replacement using the "defect" map produced by the film scanner's IR (Infrared) capability. Use the Grain Suppression to minimize the potential of grain versus dirt in the defect map; the higher the setting the less grain is passed.

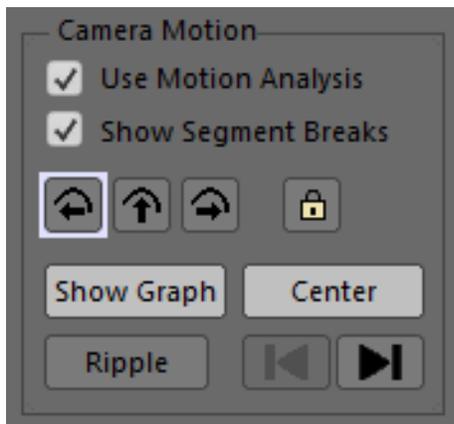
Using Motion Analysis with Shine

In order to use Shine with camera motion analysis, Cut Detection and Motion Analysis must be run for the clip prior to processing. Refer to: [Using the Motion Tool](#) for instructions on these steps and note that you can do Cut Detection and Motion Analysis concurrently if desired, but be aware that vetting the cuts to eliminate false positives and negatives is required prior to working in any tool that uses Cut Detection.

1. To proceed, enable the Use Motion Analysis and Show Segment Breaks checkboxes.

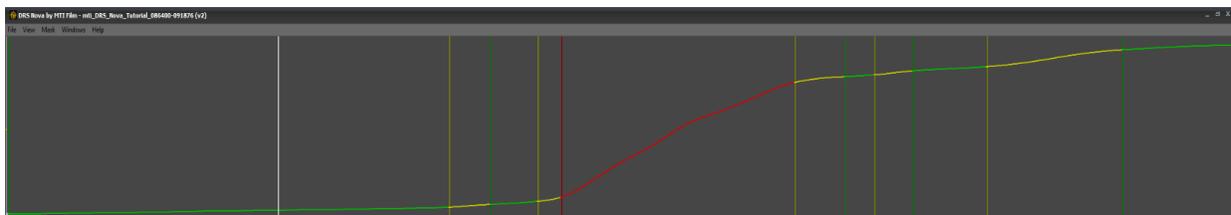
There are three Motion Type buttons: Green: Static, Yellow: Low, and Red: High motion separated by “segment breaks” that indicate the transition from one motion type to another.

Note: If “Use Motion Analysis” is left disabled, Shine ignores camera motion analysis.



2. Click the “Show Graph” button. The motion analysis graph will appear at the top of the UI with different colored segments indicating their motion types.
3. Navigate to a shot in the clip.
Note it does not have to be the first shot in the clip.

4. To only show the current shot and its analysis, click the Center button or press Shift+C.



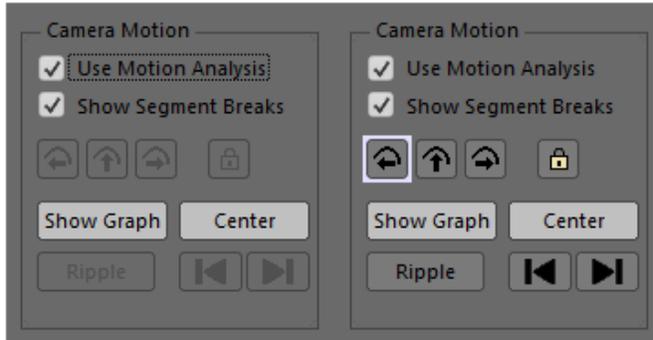
Navigating to Next or Previous Motion Segments

To move to the next motion segment in the current shot, press CTRL+SHIFT+F or click



To move to the previous motion segment in the current shot, press CTRL+SHIFT+S or click

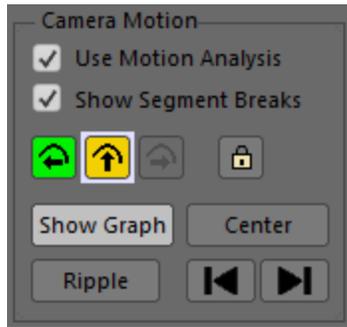




No Motion Analysis Present

Motion Analysis Present

If no motion analysis has been processed for a shot, all the buttons will be disabled. If motion analysis has been processed, motion types present in the shot will be represented by enabled motion buttons. When the timeline cursor navigates to a motion type, a white bounding box appears around the corresponding motion button. In the above example on the right, all three motion types are present in the shot and the timeline cursor is located on a Static segment as indicated by the white border.



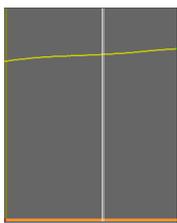
In this example a Static Motion button in the shot was enabled by the user and a Low Motion segment is currently enabled and focused as indicated by the white border. The High Motion button is disabled since this motion type does not exist in the shot.

The Lock button is enabled for use if desired.

If a motion segment type has been previously enabled but a matching one in the same shot is currently focused but no value has been applied or rippled, then its button will be shown disabled with a white border, for example:



Protecting and Locking Motion Segments



Locking a motion segment saves the current settings and protects it from any overriding command such as Ripple. To lock a single segment, navigate to the motion segment and press CTRL+L or click the Lock button . To unlock, repeat the action.

The status bar at the bottom of the segment will turn **Orange**.

To Protect matching segments in the shot, click the Ripple button

To Protect matching segments in the shot and clip, SHIFT+click the Ripple button.

Affected matching segments inherit the source's settings and are protected. Their status bars will turn **Orange**

Disabling and Locking Motion Segments

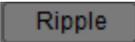
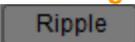


To disable and lock a motion segment so it will not be processed:

1. Click on the motion segment and leave the motion button disabled
2. Press CTRL+L or click the Lock button 

Setting Parameter Values for a Segment and Rippling them in Shine

After a segment's parameter values have been set, you can ripple the status to all matching segments in the shot and/or the clip. For example:

1. A shot has all three motion types, Static, Low, and High 
2. The user navigates to a Static motion segment and enables the Static button 
 - a. The segment's graph is enabled and the tool's filters are enabled "ready".
 - b. The user enables Shine's white filter, which inherits the last saved parameters, if any.
 - i. The segment's Status bar turns **Cyan** and the white filter parameters are auto-saved. If desired, the user can adjust the filter's parameters values.
 - c. The user clicks the Ripple button 
 - i. All matching motion segments in the shot are enabled and their Status bars turn **Blue**, indicating that their settings were copied from a neighboring segment.
 - d. **Or**, the user can press SHIFT+click the Ripple button.
 - i. All matching motion segments in the shot are enabled and their Status bars turn **Blue**, indicating that their **settings** were copied from a neighboring segment AND...
 - ii. All matching motion segments in the clip are enabled and their Status bars turn **Magenta**, indicating that their **settings** were copied from a neighboring shot.
 - e. The user Protects the segment by pressing CTRL+L or clicks the Lock button 
 - f. The Status bar for the segment turns **Orange**.
 - g. The user clicks the Ripple button 
 - i. All matching motion segments' Status bars in the shot turn **Orange**, indicating that their **settings** were copied from a neighboring segment and locked.
 - h. **Or**, the user can press SHIFT+click the Ripple button.
 - i. All matching motion segments' Status bars in the shot and clip turn **Orange**, indicating that their **settings** were copied from a neighboring segment or shot and locked.
3. The user navigates to Low and High motion segments and enables their respective motion buttons   and can then repeat the above steps.

NOTE: In Shine, SHIFT+Clicking a motion segment button will automatically inherit the last saved parameters settings.

Auto-Saving Segment Settings

The following conditions invoke Auto-Saving:

1. Navigating to another segment	6. Switching tools
2. Rippling the current segment	7. Switching clips
3. Locking the current segment	8. Previewing or Rendering
4. Disabling the current segment	9. Adding a shot to a PDL
5. Navigating to another shot	10. Exiting or Quitting the program

AutoFilter and Shine Shortcut Keys

Function	Keys	Module	Note
Filters			
New Filter	=	AutoFilter	Creates a new filter
Load Filter	CTRL + L	AutoFilter	Opens load saved filters dialog
Unload Filter	Click button	AutoFilter	Unloads the selected filter(s) from list
Delete Filter	Click button	AutoFilter	Permanently deletes selected filter(s) from list
Save Defaults	Click button	AutoFilter	Saves current parameters as Defaults for selected filter(s)
Reset Filter(s) to Defaults	Click button	AutoFilter	Resets Default parameters for selected filter(s)
Basic Parameters			
Toggle Mask shapes	Q	Both	
Toggle ROI Mode	SHIFT+Q	Both	
Reject pending Fix	A	Both	
Max Size	1	AutoFilter	
Min Size	2	AutoFilter	
Contrast Sensitivity	3	AutoFilter	
Grain Suppression	4	AutoFilter	For Alpha Filter only
Fix Tolerance	5	AutoFilter	
Motion	6	AutoFilter	
Correction Edge Blur	7	AutoFilter	
Dust Size	8	AutoFilter	
Toggle use selected filter	0	AutoFilter	
Toggle Use Hard Motion on Dust	Use checkbox	AutoFilter	
Toggle Use Past Frames Only	Use checkbox	Both	
Commands			
Preview current Frame	D	Both	
Preview marked frame range	SHIFT+D	Both	
Render current Frame	G	Both	

Render marked frame range	SHIFT+G	Both	
PDL - Add current shot	, (comma)	Both	
PDL - Add all shots	SHIFT+, (comma)	Both	
Pause Render	Spacebar	Both	
Resume Render	Spacebar	Both	
Stop Render	CTRL+Spacebar	Both	
Display Commands			
Toggle between pending Highlights and Fixes	SHIFT+T	Both	This allows for the user to choose whether the Highlights of the fixes or the actual Fixes will be shown when previewing
Toggle pending Fixes/Current Values	T	Both	
In Alpha Filter, toggle Red Grain Suppression display If Yellow Defect map is enabled, toggle with Red Grain display	CTRL+T	Both	You can also press CTRL+5 on the numeric keypad to turn on the Yellow Defect Map
Toggle Processed Fixes Highlights & Current Values	W	Both	Depending on how the Preference is set on the File/Preferences/General Tab, the W and SHIFT+W functions can be reversed.
Toggle Original Values & Current Values	SHIFT+W		
Mouse function Left Drag		Both	Draw mask or ROI depending on selection

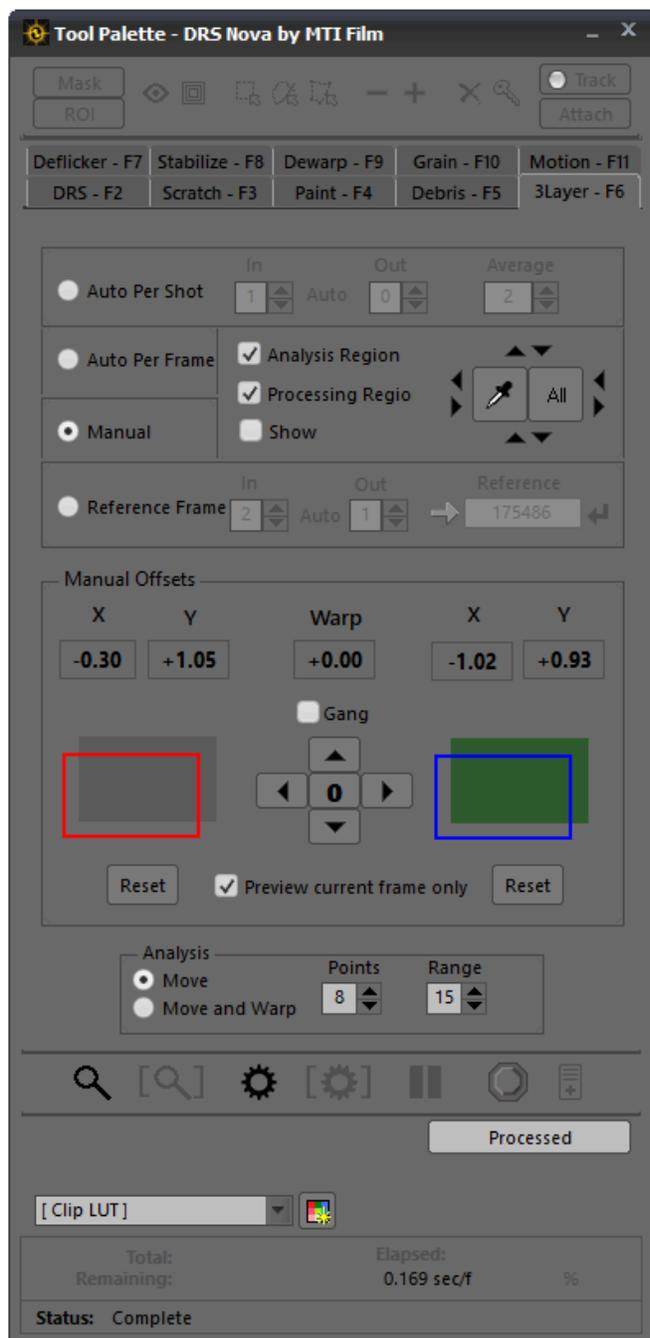
Shine only Shortcut Keys

Preset 1, 2, 3, and 4	1, 2, 3, 4	Use Shift to retain current settings when switching presets without recalling the values of the target preset.
Toggle Yellow Alpha Defect Map	CTRL+T or CTRL+5	
Toggle Lock Segment Settings	CTRL+L	
Go to Previous Segment	CTRL+SHIFT+S	
Go to Next Segment	CTRL+SHIFT+F	

Using the 3 Layer Registration Tool

The 3 Layer Registration tool is used to correct misaligned RGB layers that have been combined into a RGB Master file. It can remove horizontal, vertical, rotational and geometric (warping) defects.

3 Layer Registration offers 4 different processing modes.



1. **Auto Per Shot** analyzes a sample group of frames within a single shot and applies an average of their corrections to all frames in the shot. The frame(s) at the beginning or end of the shot, which may display uncharacteristically severe damage, can be excluded from the sample group and processed individually.
2. **Auto Per Frame** applies automated corrections to each frame, individually.
3. **Manual** mode allows for automated or fully manual correction of the current frame or a range of frames.
4. **Reference Frame** mode allows you to select a representative frame and applies that frame's correction to all frames in the shot. The frame(s) at the beginning or end of the shot, which may display uncharacteristically severe damage, can be excluded from the sample group and processed individually.

After the tool has completed automatic corrections in Auto Per Shot, Auto Per Frame or Reference Frame mode, you can apply additional manual corrections.

In each registration mode, corrections can be applied in one of two ways:

Move Only - Using the green layer as a control, rigidly move the red and blue layers to match.

Move and Warp – Using the green layer as a control, moves, stretches and skews the red and blue layers for more precise alignment in the case where one or more of the layers has warped uniquely from the others.

In either mode, you will need to set the number of Points and the Analysis Range

Points - The number of tracking points to use. 3 Layer Registration analyzes the frame to automatically find one or more tracking points it will then use to align the layers. Generally, the greater the number of points, the slower processing will be. In some cases, more points will not guarantee a higher quality result, so typically you should start with lower values and only increase the number of points if the results are not acceptable. The values of points are 1 to 48.

- a. In Move Only mode, you must set the value to 1 or greater. A good starting value is 8.
- b. In Move and Warp mode, you must set the value to 4 or greater. It's a good idea to choose a value that divides evenly by 4 (4, 8, 12, 16...) for best results from the alignment algorithm. A good starting value is 12.

Range - Determines how far away 3 Layer Registration will search for a match. Or, in other words, the largest shift (in pixels) between the Red and Green or Blue and Green channels. For shots where the layers are only slightly mis-aligned, lower values are better. The larger the range, the slower 3 Layer Registration will process. If the misalignment is especially severe, it is important to select a large enough Range. The values of Range are 1 to 32. A good starting value is 12.

Viewing a Single Channel

When previewing and adjusting manual and automated fixes, it can be helpful to view a single channel at a time, rapidly switching between the Red or Blue channel and the Green channel.

Using the CTRL key + the Number Pad:

CTRL+0 - displays all three channels normally

CTRL+1 - displays only the Red channel in grayscale

CTRL+2 - displays only the Green channel in grayscale

CTRL+3 - displays only the Blue channel in grayscale

Auto Per Shot Mode

1. Set IN and OUT points
2. Select Auto Per Shot Mode
3. Often, the frames near the scene cut have been damaged more severely than the rest of the frames and, therefore, should not be included in the average correction applied across the rest of the clip by Auto Per Shot. Set In and Out AutoFrames – AutoFrames allows you to process frames at the beginning and end of the scene separately from the rest of the clip.
 - a. Set In AutoFrames – the In AutoFrames value sets the number of frames at the beginning of the marked range that will not be processed by Auto Per Shot Mode. Instead, these frames will be processed individually in Auto Per Frame mode. So, if IN AutoFrames is set to 2, the first two frames of the marked range will be processed separately.
 - b. Set Out AutoFrames – the Out AutoFrames value sets the number of frames at the end of the marked range that will not be processed by Auto Per Shot Mode. Instead, these frames will be processed individually in Auto Per Frame mode. So, if OUT AutoFrames is set to 2, the last two frames of the marked range will be processed separately
4. Set Average – The Average value sets the number of frames sampled in the marked range to determine the automatic corrections needed.
5. Choose Move Only or Move and Warp Mode
6. Set Points and Range values
7. Preview the automated corrections by pressing the D key (Preview 1) or SHIFT+D (Preview All). The calculated fix values will be displayed in the Base Settings area.
8. Apply manual corrections on top of the automatic corrections as needed. You can not change the Base Settings – the final settings will be the Base Settings plus any Manual adjustments.
9. Render the corrections by pressing SHIFT+G

Auto Per Frame Mode

1. Set IN and OUT points
2. Select Auto Per Frame Mode.
3. Choose Move Only or Move and Warp Mode
4. Set Points and Range values
5. Preview the automated corrections by pressing the D key (Preview 1) or SHIFT+D (Preview All). The calculated fix values will be displayed in the Base Settings area.
6. Apply manual corrections on top of the automatic corrections as needed. You can not change the Base Settings – the final settings will be the Base Settings plus any Manual adjustments.
7. Render the corrections by pressing SHIFT+G

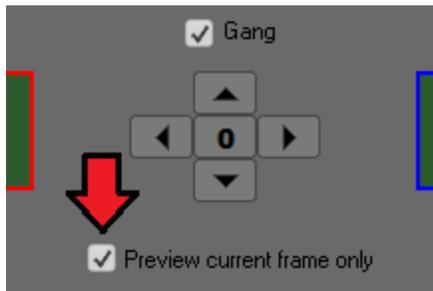
Manual Mode

1. Set IN and OUT points
2. Select Manual Mode
3. Select Layers to Process – 3 Layer Registration uses the Green layer as the base and aligns the Blue and Red channels to it.
4. Click the Red layer panel (1 key) to toggle selection of the Red layer.
5. Click the Blue layer panel (3 key) to toggle the selection of the Blue layer
6. Check Gang (2 key) to toggle selection of both layers (recommended)
7. Select Move Only or Move and Warp mode
8. Set number of Points and Range
9. Manual mode can do a first automatic pass. To start this process, press Preview 1 (D). Unlike other modes, the computed values are not placed in Base Settings, but in the editable Manual values area.
10. Use the arrow keys to adjust the positioning of the active layers. You can not change the computed Warp settings manually. The display will update as you make your changes.
11. Render the corrections to the current frame by pressing Render 1 (G) or you can apply the settings across a marked range by pressing Render All (SHIFT+G).

Reference Frame Mode

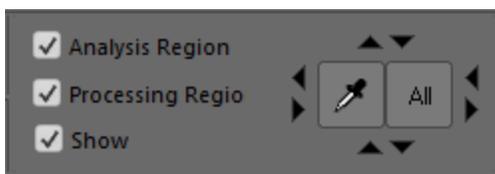
1. Set IN and OUT points
2. Select Reference Mode
3. Set In and Out AutoFrames – AutoFrames allows for processing frames at the beginning and end of a shot separately from the rest of the clip. Often, the frames near the scene cut have been damaged more severely than the rest of the frames and cannot be included in the average correction applied across the rest of the clip by the Reference.
 - a. Set In AutoFrames – the *In AutoFrames* value sets the number of frames at the beginning of the marked range that will not be processed by Reference Mode. Instead, these frames will be processed discretely in Auto Per Frame mode. For example, if *In AutoFrames* is set to 2, the first two frames of the marked range will be processed separately.
 - b. Set Out AutoFrames – the *Out AutoFrames* value sets the number of frames at the end of the marked range that will not be processed by Reference Mode. Instead, these frames will be processed discretely in Auto Per Frame mode. For example, if *Out AutoFrames* is set to 2, the last two frames of the marked range will be processed separately
4. Set Reference frame – 3 Layer Separation will calculate the fix parameters on this frame and then apply those settings across the marked range.
5. Choose Move Only or Move and Warp Mode
6. Set Points and Range values
7. Preview the automated corrections by pressing the D key (Preview 1 frame) or SHIFT+D (Preview All). The calculated fix values will be displayed in the Base Settings area.
8. Apply manual corrections on top of the automatic corrections as needed. You can not change the Base Settings – the final settings will be the Base Settings plus any Manual adjustments.
9. Render the shot corrections by pressing SHIFT+G.

Apply Correction to Preview Frame Only



At times it may be useful to only see the correction on a single frame and not on previous or subsequent ones. If needed, enable the “Preview current frame only” checkbox.

Analysis and Processing Region



Use the Analysis Region to focus on a particular portion of the frame for the tool to compute adjustments to the layers. When using the Analysis Region the Processing region can be enabled or disabled. If enabled, the processing will be limited to

the Analysis Region. If disabled, the whole frame will be processed while the analysis will be limited to the Analysis Region as determined by the blue reticle.

To move the reticle, click on the up and down, left and right arrows. To move in greater increments use the SHIFT key. For smaller increments use the CTRL key.

If there is a black matte around the edges of the picture and you don't want to process the matte, left-clicking on the matte using the Eye Dropper will automatically select the picture area excluding the matte. The Eye Dropper can be enabled by either clicking on the button or pressing CTRL+SHIFT. The cursor will turn into an Eye Dropper icon.

Using the PDL

If you wish to set parameters for marked ranges of the clip but want to process them later, you can use the PDL (Process Decision List).

1. Press CTRL+, (comma) or click Windows/PDL Viewer to open the PDL Viewer
2. Establish mark In and Out points. (press the H key if cuts are on either side of the shot)
3. To add one shot at a time to the PDL, press the , (comma) key or click the PDL icon 
 - a. To add all shots in the clip to the PDL, after cut detection has been run and validated, press SHIFT+, (comma) or SHIFT+click PDL icon.
 - i. All shots added will record the same values.
4. When you've added all the events you want to the PDL you can render the PDL by pressing the Render button on the PDL Viewer window.
5. If you wish to save the PDL for later use, place focus on the PDL Viewer and press CTRL+S or click the save icon.

3 Layer Shortcut Keys

Function	Keys	Note
Red Layer	1	Select Red layer for adjustment
Gang Layers	2	Select both Red and Blue layers for adjustment
Blue Layer	3	Select Blue layer for adjustment
Mode Selection	4	Cycles through registration modes
Processing Region On/Off	5	
Analysis Mode Selection	6	Cycles between Move Only and Move and Warp modes
Move selected layer(s)	Arrow keys	Moves selected layer(s) up, down, left and right
Master Reset	SHIFT+C	
Commands		
Preview current frame	D	
Toggle Preview	T	Toggle pending fix and original values
Preview marked frame range	SHIFT+D	
Render current frame	G	
Render marked frame range	SHIFT+G	
PDL - Add current shot	. (comma)	Add shot to PDL
PDL - Add all shots	SHIFT+, (comma)	Add all shots to PDL
Show/Hide Region Reticle	CTRL+T	
Pause Render	Spacebar	
Resume Render	Spacebar	
Abort Render	CTRL+Spacebar	
Mouse functions		
Mouse Wheel		Duplicates function of up/down arrows
ALT Mouse Wheel		Duplicates function of Left/Right arrows

Using the Deflicker Tool

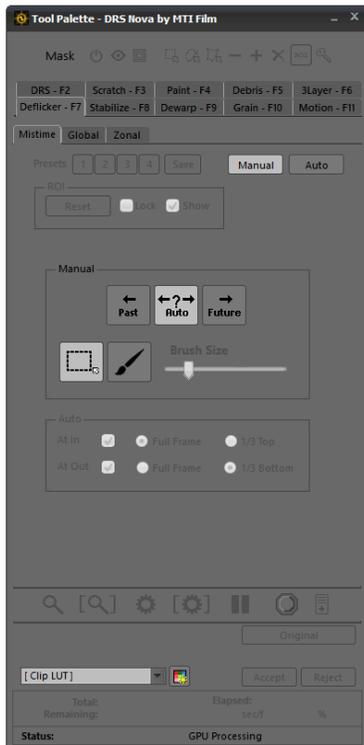
Aging of film can result in one or more color emulsion layers to fade. This results in what MTI refers to as “color breathing”. Aging can also cause density variations, which result in either “Global” or “Zonal” flicker. Global flicker manifests as overall frame density variations from frame to frame. Zonal flicker manifests as density variations in different areas of the frame on a frame by frame basis.

“Mistimes” (also known as “printer lag”) are normally found on the first and last frames of a shot. They appear as a gradient at either the top or bottom of the frame respectively. Mistimes are usually found in film elements downstream of the original cut negative. As the film was “timed” for color or density, a cue or “notch” was placed in advance of each shot in order to change the printer lights settings to reflect the values prescribed by the laboratory timer. Sometimes the change of values from one shot to the next was too great for the printer lights to reset in time for the first and last frames of the incoming shot and, therefore, caused the mistime gradient artifacts.

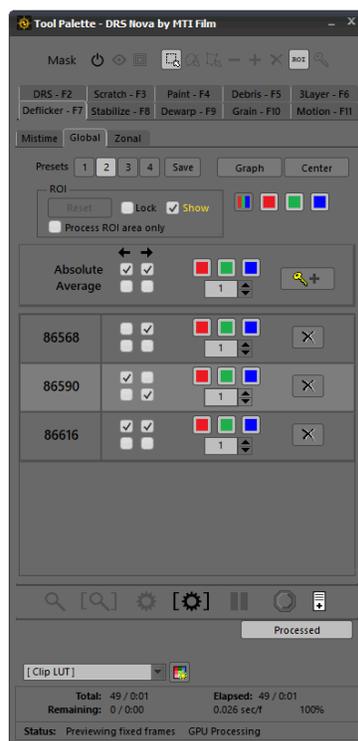
The Deflicker Tool consists of three modules,

1. Mistime - Manual and Auto Modes
2. Global - Used for color breathing and full frame density variations
3. Zonal - Used to correct areas of the frame with disparate density intensities

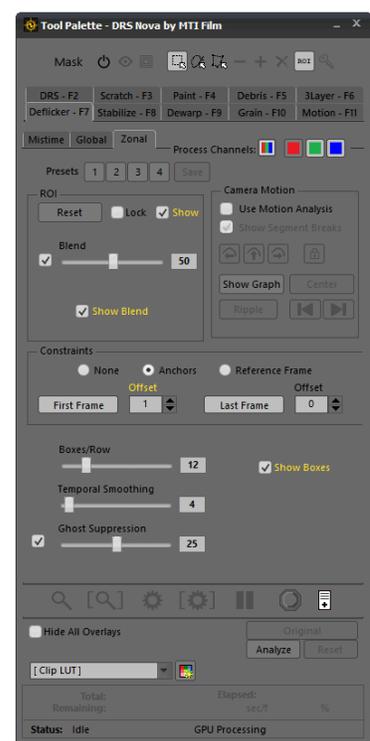
Mistime



Global

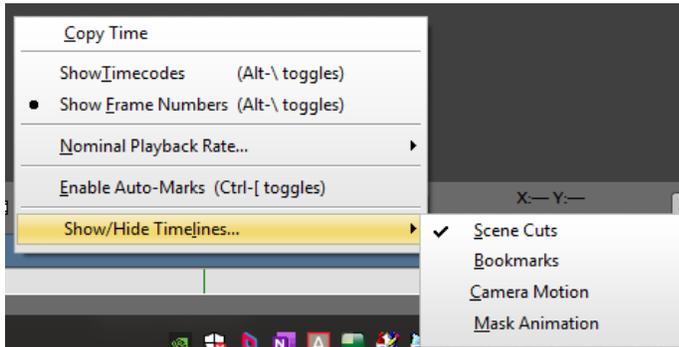


Zonal

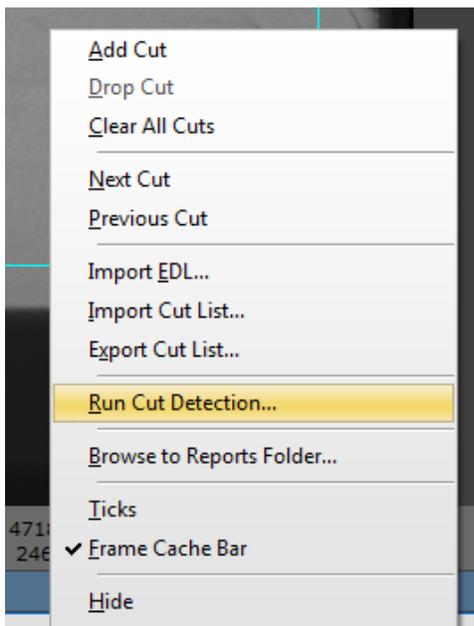


Preparing a Clip for Analysis

For all the deflicker modules, it is essential that “cut detection” is run on a clip prior to using the tool or, at a minimum, “breaks” (cuts) are added to the timeline for the shots to be processed. The analysis phase depends on cuts in order to know where to begin and end the analysis.



To run cut detection, make sure the Cuts timeline is visible at the bottom of the UI. A pair of scissors should be present on the extreme lower left of the UI. If not, press the O key or right-click on the blue Timeline Scale bar and click Show/Hide Timelines... then select Scene Cuts.



Right-click on the Cuts timeline and choose “Run Cut Detection” from the context menu.

Depending on the length of the clip the cut detection time will vary.

If you are just correcting one shot then you can insert a cut by pressing the N key on the first frame of the current and succeeding shots.

Using the PDL

For Deflicker, using a PDL (Process Decision List) can help make efficient use of time.

To create a PDL event:

1. Choose the settings
2. Press CTRL+ , (comma) key to open the PDL Viewer
 - a. You can add one shot at a time to the PDL
 - i. Mark In and Mark Out on a shot (press the H key if there are cuts on either side of the shot).
 - ii. Press the , (comma) key or click the PDL button  .
 - b. If cut detection has been run and validated, and the same values can be used for all shots, you can add all the shots in the clip to the PDL by pressing SHIFT+ , (comma) or pressing SHIFT+click the PDL button.
3. When you've added all the events you want to the PDL you can render the PDL by pressing the Render button on the PDL Viewer window.
4. You can also save the PDL for later use or for safety. To save the PDL, place focus on the PDL Viewer window and press CTRL+S or click the save icon.

Using Presets

All deflicker modules include 4 Preset buttons to save user defined settings configurations.

Saving or Recalling a Preset

Note: To retain the current settings without loading the settings of the targeted preset, press and hold Shift prior to selecting the preset number.

Saving a Preset

Configure the tools parameters and then press the Save button.
The Save button will dim unless the values are changed.

Recalling a Preset

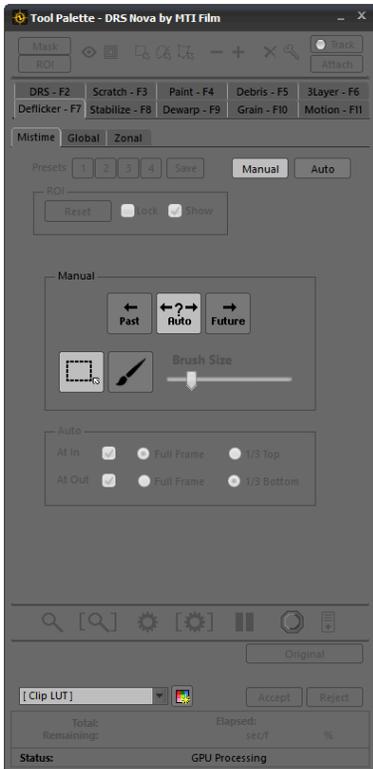
Press the 1 through 4 keys, or click a corresponding button.
The existing Preset configuration settings will be loaded

Overriding a Preset

To override an existing preset with the current values, press and hold SHIFT+click the preset number. Then press the Save button.

Using the Mistime Module

There are two modes of operation in the Mistime Tool:



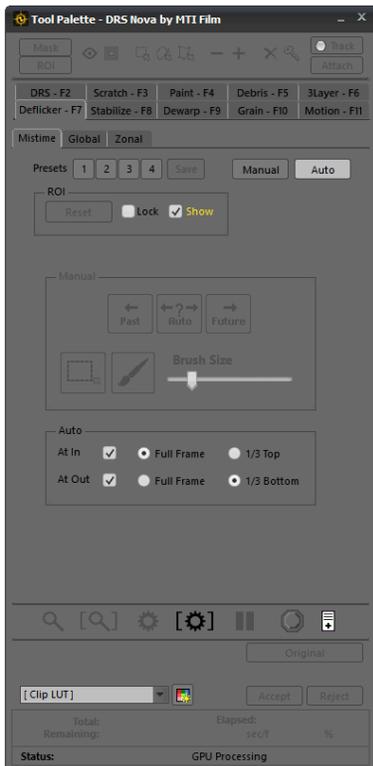
Manual

In the Manual mode, draw a ROI on the area affected by the mistime and then press the T key to toggle between the pending fix and the original defect.

Press G to Accept or A to Reject.

NOTE: Try drawing the ROI on the full frame first and judge the fix by observing the whole frame for possible artifacts that can be caused by high motion. If the fix fails, draw a smaller region around the mistime area only.

For some fixes try using the brush. Press the Q key to toggle between a rectangle and the brush or click the brush button. Use the mouse wheel to size the brush.



Auto

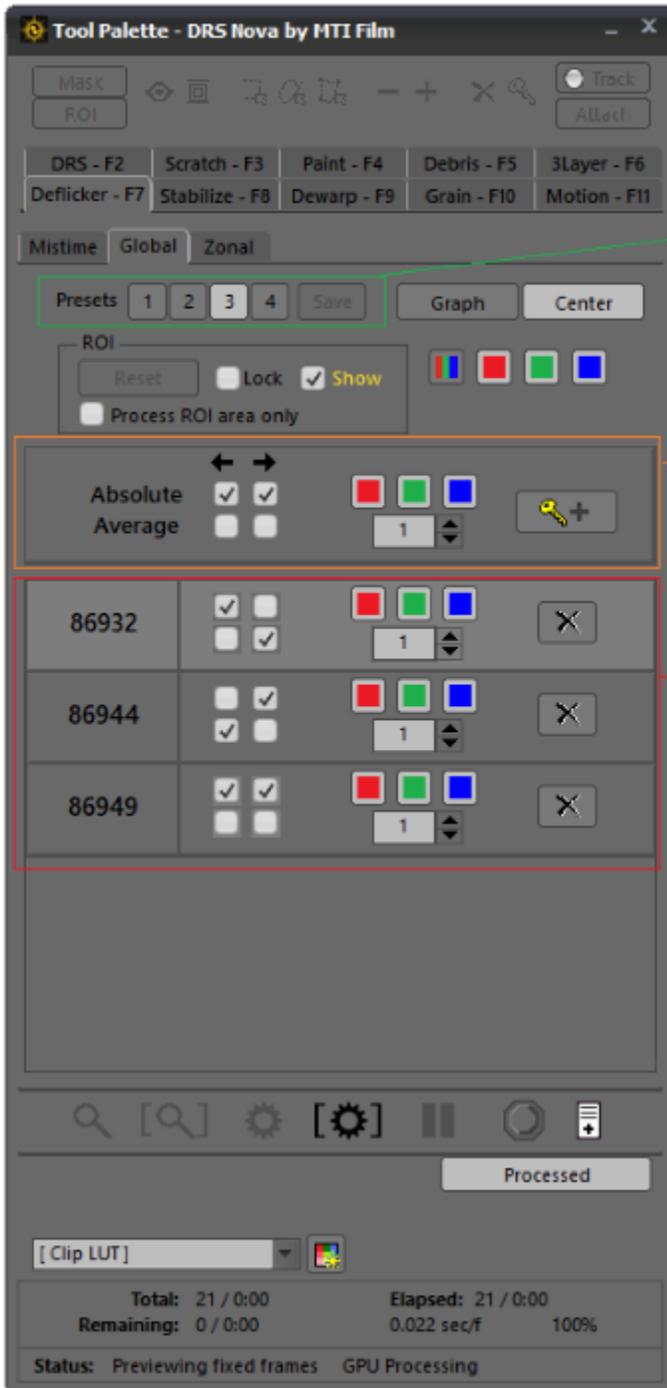
In the Auto Mode, shot breaks must be present so that the tool can locate the first and last frames of a shot. You can determine whether the In and Out frames will be addressed by the tool and whether the automation corrects the Full frame or a 1/3 of it. The ROI determines the frame boundaries so it should be drawn to include all the frame content regardless of the Full or 1/3 setting.

To preview fixes in Auto Mode, press Ctrl+D. Assuming that shot breaks are present, the tool will automatically move to the beginning and end frames of each shot in the marked range and, after analysis is completed, allow you to press the T key to toggle between the pending fix and the original image. Repeated presses of Ctrl+D jumps to successive shots in the marked range.

Mistime Shortcut Keys

Function	Keys	Note
Preset 1	1	Presets only function in AUTO mode. Use Shift to retain current settings and switch without retrieving values of selected Preset.
Preset 2	2	
Preset 3	3	
Preset 4	4	
Toggle Manual/Auto	5	
Cycle through Past/Auto/Future	6	Manual Mode only
Toggle At In	7	Auto Mode only
Toggle At In - Full / 1/3	8	
Toggle At Out	9	
Toggle At Out - Full / 1/3	0	
Go forward to First/Last frame of each shot	CTRL+SHIFT+F	Mistime only
Go backward to Last/First frame of each shot	CTRL+SHIFT+S	
Preview current frame	D	Auto Mode only
Toggle Original/Fixed Pixels	T	After pressing D
Reject Fix	A	After pressing D
Render current frame	G	
Render marked range	SHIFT+G	
Preview first and last frames	CTRL+D	Auto Mode only - Press key combo repeatedly
Cycle Rectangle and Brush	Q	
Repeat previous fix on current frame	~ (tilde)	
Toggle Show ROI	CTRL+T	
Toggle ROI lock	CTRL+SHIFT+T	
Add marked range to PDL	, (comma)	

Using the Global Module



Presets

The Preset buttons (1 - 4) store user defined settings as determined in the Configuration Section. Click a Preset button, configure the controls and then click the Save button.

Configuration Section

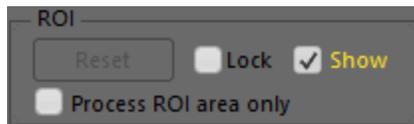
The Configuration Section determines which controls will be applied to the Keyframe prior to being added to the Keyframe List. Configurations can be saved to the Presets.

Keyframe List

After the controls of a Keyframe are set in the Configuration Section and added to the list, the controls can still be modified while in the list.

Each shot has its own list of Keyframes.

Region of Interest (ROI)



The ROI determines which area of the frame will be used for analyzing the film frames in order to generate color and flicker metadata as well as the graph used by the tool. Using the mouse, the region should be drawn from the top left to bottom right of the frame in an area that makes most sense for analysis. Soundtracks and frame lines should be avoided.

If the “Process ROI area only” checkbox is enabled, final rendering will be applied only to the ROI area. If left unchecked, the correction will be applied to the whole frame.

Prior to analysis, be sure to mark the range of segments you wish to analyze and graph.

To mark a range of shots, use a Mark In (E key) and Mark Out (R key)

To graph the entire clip, press SHIFT+H to mark from the first to last frame of the clip.

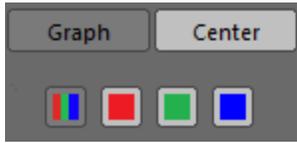
To graph one shot from cut to cut, press the H key.

After defining the range, draw the ROI and lock it.

The Show checkbox is enabled by default. To toggle it, press CTRL+T or click the checkbox.

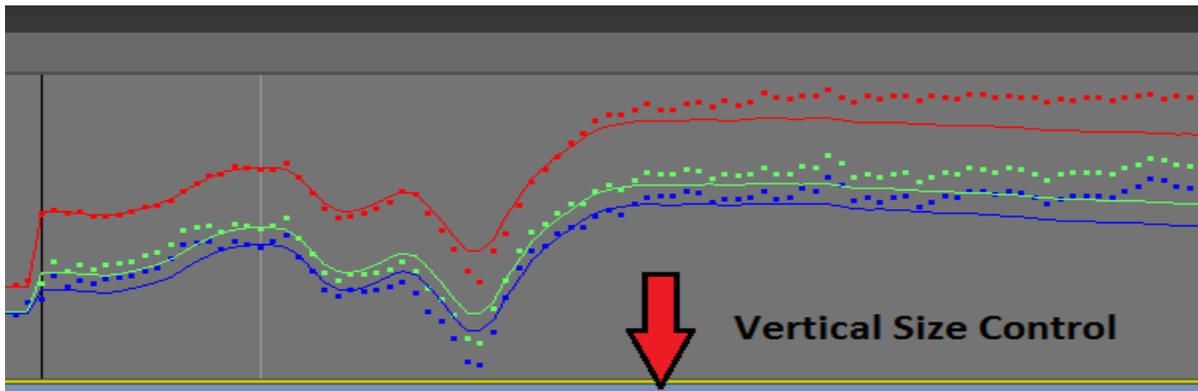
The Lock checkbox is disabled by default in order to allow the ROI to be drawn on a shot by shot basis. When Lock is enabled the ROI cannot be altered. It is recommended to lock the drawn region for all contiguous shots that are served by its size and position.

Graph



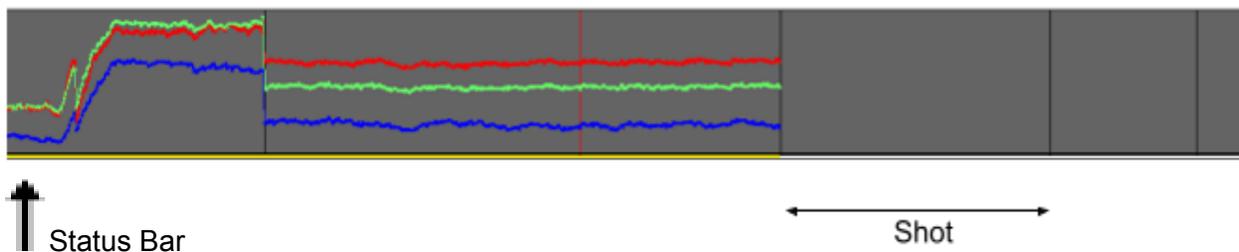
The Graph timeline, located on the top of the Player, determines which shots of the clip have been graphed and which (or all) of the color channels are displayed. In order to begin using the Global Module, a graph must be generated for the desired shots.

When the range of frames to be graphed are marked (In to Out), click the Graph button or press CTRL+G. After the graph is generated, you can use the red, green, and blue control buttons to turn off and on the three color channels independently (explained in greater detail later).

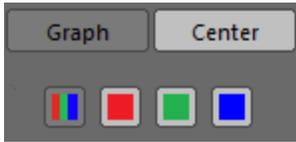


The graph timeline can be sized vertically by clicking on the light blue control at the bottom of the graph and dragging up or down.

The Status Bar located at the bottom of the graph displays the current state of media rendered by the tool. If no graph has been generated, the bar is white. If a graph is generated but no frames have been rendered the bar is yellow. When frames have been rendered, the bar is blue.

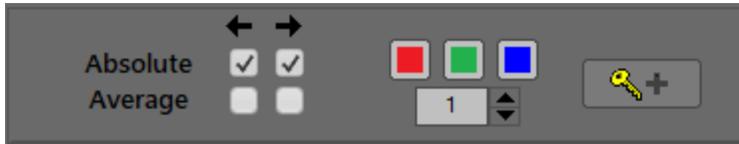


In the Global Module, the cuts are used as “Breaks” that act as boundaries where corrections begin (at the Head Break) and end (at the Tail Break). This is to prevent corrections from overlapping shot changes. However, if you wish to correct a change in color or density between two segments where, for example, a dissolve occurred, then you have to delete any cut (CTRL+N) within the dissolve and place a keyframe on either side of it.



A shot is defined by two sequential cuts. When the “Center” function is enabled, the graph of the current shot will be scaled to the width of the UI, fully visible from left to right. Click the Center button or press SHIFT+C to enable and disable this function.

Keyframe Controls



The Keyframe Controls determine the configuration of the Absolute and Average directional and color controls prior to adding a Keyframe to the list.

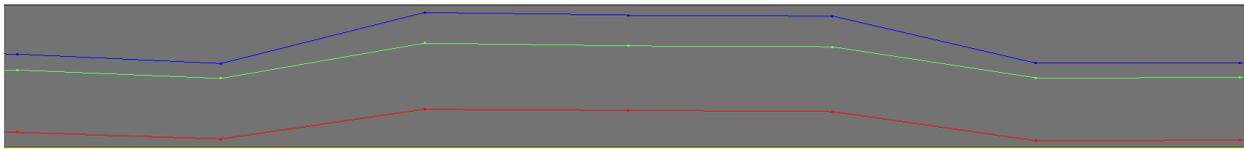
Understanding Absolute versus Average Keyframes

A keyframe represents a location in the timeline that will be used as a reference frame. Keyframe references are not altered by the tool, they are used as “anchors” by which past or future frames in a shot are corrected according to the type of keyframe invoked and the direction the correction is applied.

Understanding the Absolute Keyframe

An Absolute keyframe causes frames affected by it to replicate exactly the color and luminance properties of the frame where the keyframe is located.

For example, in this color shot:

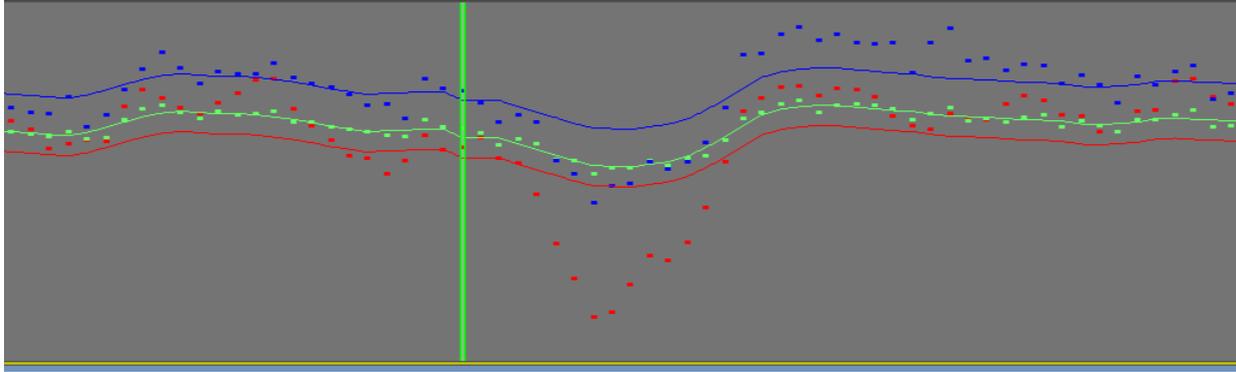


Before Absolute Keyframe

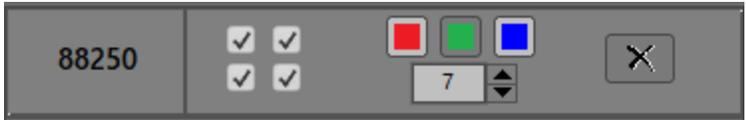


After Absolute Keyframe

The “Before Absolute Keyframe” graph has a 3 frame bump in the middle of the shot caused by a luminance shift. After placing an Absolute Keyframe reference near the beginning of the shot, all the past and future frames are corrected to replicate the same alignment of color channels as the reference keyframe. The direction of the correction is determined by the two check boxes adjacent to the Absolute and Average Keyframe controls. In the above example, both the past and future checkboxes are enabled.



The green channel on Keyframe 88250 is disabled, therefore it will act as a reference for the red and blue channels to follow.



By enabling the Average checkboxes in addition to the Absolute ones, the value in the spin box affects the amount of smoothing applied to the red and blue channels.

Understanding the Average Keyframe

An Average Keyframe uses the spin box located adjacent to the Direction Control checkboxes. The spin box value indicates the number of frames the tool will temporally “smooth” any fluctuations in color or luminance. The higher the values, the more linear the correction, which has a greater possibility of artifacting so carefully assess the effect in preview mode.

For Global flicker, the amount of “smoothing” ranges from 0 to 20. Whether the correction is applied to previous and succeeding frames is controlled by the two independent check boxes.

The Absolute and Average controls can be used in tandem on a single Keyframe in any combination. For example, the Absolute direction control can be enabled in reverse for previous frames while the Average direction control is enabled forward.



This is particularly useful when a dissolve needs some smoothing. By placing a cut (break) immediately before and after the dissolve and adding forward and reverse direction Average keyframes to their respective cuts, the dissolve will be smoothed without affecting the image adversely.

Presets - Saving and Recalling

Up to 4 presets can be saved by setting the Keyframe Controls, selecting a preset button and then clicking “Save”. Presets can be recalled by pressing the 1 – 4 keys on the keyboard or clicking the preset number button.

Note: To retain the current settings without loading the settings of the targeted preset, press and hold Shift prior to selecting the preset number.

Adding and Deleting Keyframes

To add a Keyframe to the list click the Add Keyframe button or press the “B” key. Once a Keyframe is added to the list it can be modified with the result reflected in Preview. To delete it, navigate to it or click it in the list and then click the delete button  or press CTRL+B. To delete all Keyframes in a shot, navigate to the shot and press CTRL+SHIFT+B.



Navigating to Keyframes

To go to a previous Keyframe, press CTRL+SHIFT+S.

To go to the next Keyframe, press CTRL+SHIFT+F.

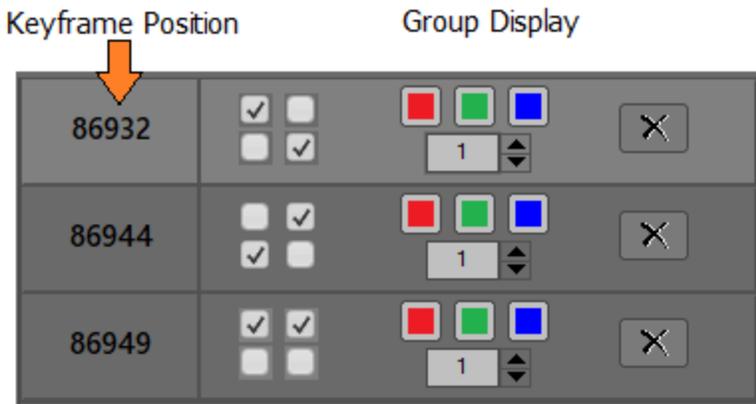
Previewing Corrections

Assuming the hardware used can support it, after adding keyframes to a shot you can preview the correction in real time. Press the T key to toggle the before and after. The timeline cursor located in the graph will be red when in the before state or green when previewing the correction.

Shots and Groups

A range of frames between two cut boundaries is called a shot. Typically many shots comprise a Master clip.

A shot can have any number of keyframes that determine the corrections applied between them. We refer to these shot-keyframes as a “Group”.



As the timeline cursor crosses from one shot to another, the Group Display updates to reflect the Keyframes associated with the current shot. As the cursor crosses from one keyframe to another, the display highlights the current keyframe.

A Group can be saved to a PDL or rendered “on the fly”. For this, however, a Mark In/Out range must be defined. Normally the In/Out marks of the shot are used, however, you can mark anywhere in and out at your discretion. The keyframes located within the marked range will be rendered.

It is recommended practice to add a group of keyframes as defined by the In and Out marks of a shot to a PDL. However, in the Global module you can choose to mark the entire clip (SHIFT+H) after adding keyframes to the shots, and then add it to a PDL for future rendering.

When a render is complete, you cannot add additional keyframes unless you “discard” the changes in the shot. For this reason it is recommended that you use all Deflicker modules in a version.

Global Module Shortcut Keys

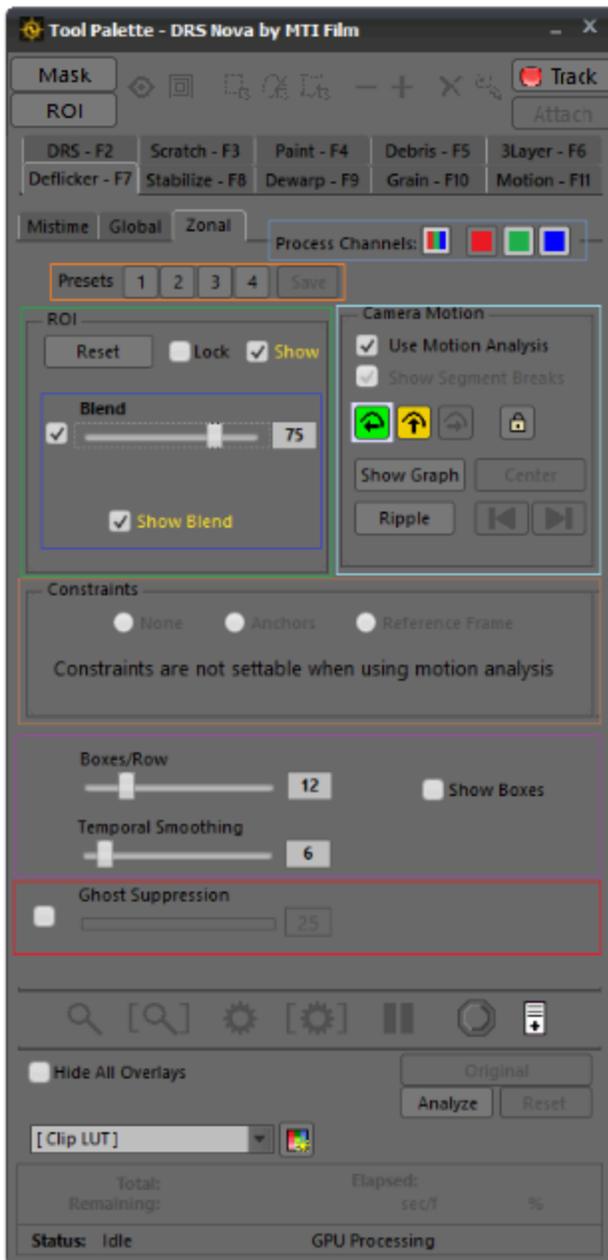
Function	Keys	Note
Select preset 1	1	Use Shift to retain current settings and switch without retrieving values of selected Preset.
Select preset 2	2	
Select preset 3	3	
Select preset 4	4	
Save selected preset	Click Save Button	
Render graph to marked range	CTRL+G	
Center shot on graph (toggle)	SHIFT+C	Centers the current shot on width of graph
Add Keyframe	B	Can also use UI "Add Keyframe" button
Delete Keyframe	CTRL+B	Can also use UI X button
Clear all Keyframes in segment	CTRL+SHIFT+B	Clears all Keyframes from cut to cut (current shot) or press CTRL+SHIFT+ X button
Go to next cut	SHIFT+F	
Go to previous cut	SHIFT+S	
Go to next reference frame	CTRL+SHIFT+F	
Go to previous reference frame	CTRL+SHIFT+S	
Render marked range	SHIFT+G	
Commands		
Add Cut	N	
Remove Cut	CTRL+N	
Toggle Preview	T	Toggle pending fix and original values
Preview marked frame range	Shift+ V	Play
Render marked frame range	SHIFT+G	
PDL	<	Add event to PDL
Use Region of Interest	SHIFT+T	
Show/Hide Region Reticles	CTRL+T	

Lock Region Reticles	CTRL+SHIFT+T	
Stop Graph	CTRL+Spacebar	
Stop Render	CTRL+Spacebar	
Mouse functions		
Draw ROI	Left Drag	

Using the Zonal Deflicker Module

Zonal Flicker Explained

Zonal flicker is the result of film emulsions fading at varying rates in different areas of the frame on a frame by frame basis. The problem is solved by dividing the frame into a series of areas, analyzing the differences between them, and applying an offset correction that produces a more uniform frame density. It is recommended that Cut Detection and Motion Analysis be run prior to using the tool, and that the cuts are vetted.



Process Channels

Use Process Channels to determine which color channels will be included in the analysis and correction of flicker. They are all enabled by default.

Presets

Choose a preset number, set the desired properties' values and click Save. To recall, press 1 - 4 on the keyboard or click the corresponding button.

ROI - Region of Interest

Determines the analysis region and the area to which the correction is applied. To include all active picture, be sure to draw the ROI to the outer boundary of the frame's image. Use the Blend slider to feather the correction between the ROI and balance of the image area. Press CTRL+T to toggle the Show/Hide checkbox.

Blend

Use the Blend Slider to "feather" the ROI correction between the ROI and the balance of the image area.

Camera Motion

When the analysis has been run in the Motion tool, it possible to set discrete values for each motion type or a segment by segment basis.

Constraints

Use the Constraint options to determine whether Anchor frames will be used for analysis and processing for a shot. "None" will average the correction, "Anchors" provide first and last frame keyframe options as well as offsets, and "Reference" locks the correction to the reference frame. When using Motion Analysis, the Constraints are disabled since the Motion segment breaks automatically determine the anchors.

Boxes and Smoothing

Boxes determine the number of rectangles that will be used during analysis. Smoothing determines the temporal smoothing between frames.

Ghost Suppression

Useful primarily for Animation shot on twos, Ghost Suppression helps eliminate ghosting of the edges of objects and characters.

Though the problem and the solution are complex, the Zonal module is designed to be simple to use. Therefore, there are only a few steps to follow.

Steps for Zonal Deflicker

Since the Zonal Deflicker module applies a full frame correction, it is best to work in a version.

Process Channels



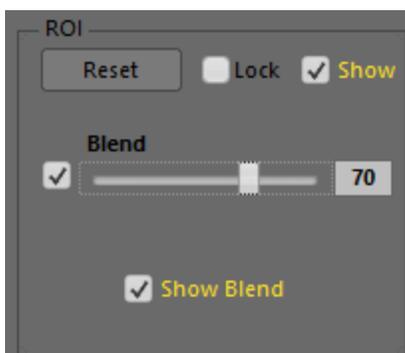
1. Determines which color channels will be included in the analysis and correction. They are enabled by default. When disabled, the channels are excluded.

Draw the ROI (Region of Interest)



2. The ROI determines the area of the frame used for analysis and correction. Generally, it is best to draw within the frame-line boundaries avoiding audio tracks and sprocket holes.

Blend (ROI)

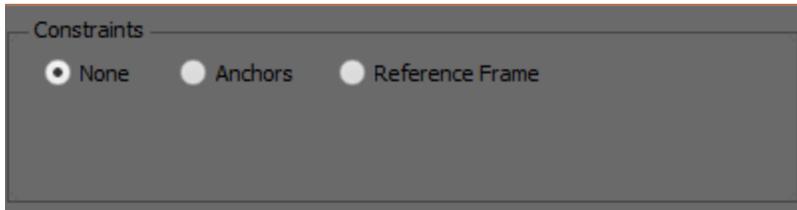


3. If Blend is enabled, the ROI boundary is used to “feather” the correction between the ROI and the balance of the image.
 - a. If the Blend function is disabled, the correction will be restricted to the drawn ROI area only.
 - b. If the Blend function is enabled, the correction is applied to the ROI and blended area.

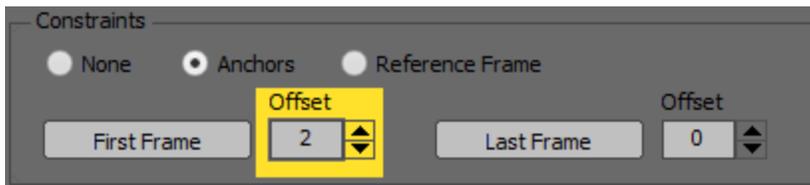
Constraints

4. Determine the type of Constraints to be used for the analysis phase

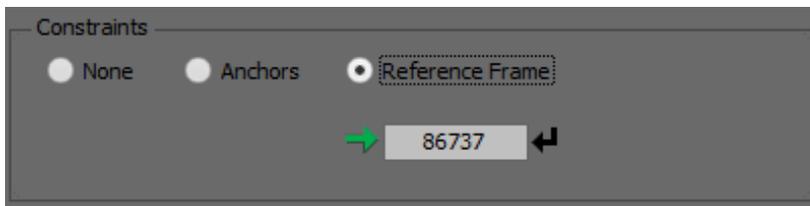
- a. **None.** Is best used for most shots where no particular reference is required



- b. **Anchors.** This option uses the first and last frames of a shot as “Anchors”, which means they will not be processed and that the frames between them will be calculated to smoothly transition to the anchors. The “Offsets” allow for the algorithm to use the offset frames as anchors. In the case of the First Frame, corrections are made to the frames previous to the offset anchor. In the case of the Last Frame, corrections are made to the frames after the offset anchor. The frames between the offset anchors are “smoothed” utilizing user input for the number of boxes and smoothing range.



- c. **Reference Frame.** This option allows a specific frame to be used for all frames contained in a shot. This is best used when there is minimal motion in both content and camera movement. The recommended number of boxes is 24 to start but you should experiment with the number. Smoothing is automatically set and cannot be changed.



NOTE: A Reference Frame is most useful when there is little movement, either camera or action, in a shot.

Boxes and Temporal Smoothing

5. Determine the number of “boxes” by which to divide the frame



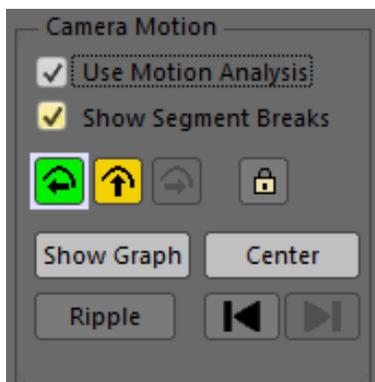
Enable the “Show Boxes” checkbox and use the two sliders to determine the number of boxes per row and the amount of smoothing that will be applied. The number of boxes shown on screen will change dynamically as the slider value is modified. After analysis, if you wish to change the number of boxes, it is necessary to reanalyze. Determine the amount of Temporal Smoothing to be applied. The value is equal to the number of frames being averaged. The Smoothing value can be changed and previewed dynamically by pressing the T key repeatedly to toggle between the Original and the Processed correction. You can also click the Original/Processed button to the same effect.

NOTE: Generally, if the frame contains a lot of motion, it is best to use lower settings for boxes and smoothing. Conversely, if the segment is static then higher settings can be used.

Ghost Suppression

6. Mainly used for Animation to eliminate ghosting on edges of characters and objects. The algorithm attempts to minimize the effect and results can be previewed dynamically by pressing the T key or clicking the Processed button repeatedly to toggle between the Original and the Processed correction. You can also click the Original/Processed to the same effect.

Use Motion Analysis

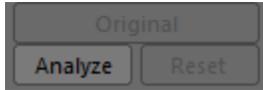


3. If Motion Analysis has been processed, it can be used to determine the settings for each motion type on a segment by segment basis.

More information on using Motion Analysis later below

Beginning the Analysis

To begin the analysis, click the Analyze button or press CTRL+G.

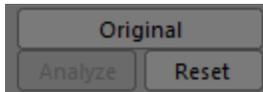


Previewing the Correction

After the analysis is completed, preview the correction.

1. Press the T key to toggle between the Original unprocessed frames and a Preview of the Processed correction. Clicking the Original/Processed button also allows for toggling. If the GPU is enabled, real time playback is possible depending on I/O and the power of the GPU (see [GPU](#) in the Preferences section to determine the GPU status).

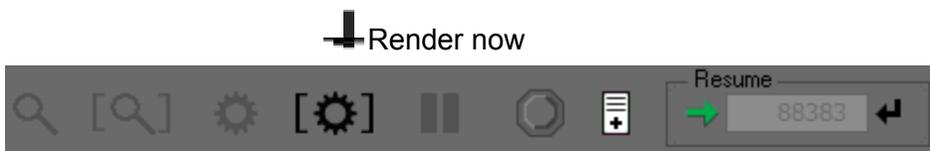
If the number of boxes needs to be changed after the analysis is completed, click the Reset button. Clicking the Reset button clears the analysis so a new value for the number of boxes can be entered and readied for re-analysis.



2. Render the result.
 - a. Mark the shot(s) you wish to render. If there are cuts on either side of the shot, press the H key to mark it.
 - i. Press SHIFT+G or click the render button to render now.

Alternatively

- ii. Add the shot(s) to a PDL to render later.
 1. To add a shot, mark it by pressing the H key and then press the , (comma) key or click the PDL button to add it.



T Add to PDL

Using Mask

If the analysis needs to be done using the whole frame but only a small area of the frame needs to be rendered, the Mask can be used. If you are not familiar with the Mask Tool, click here: [Mask Tool](#) and review the section. The Mask Tool section includes an overview of how to use the tracking feature in the Mask Tool.



1. Choose the mask shape
2. Choose if the mask is inclusive or exclusive
3. Adjust the width of the borders as desired
4. Analyze the shot
5. Preview and, if desired, render the result

NOTE: Instead of using Mask, it is recommended to draw an ROI in the area of the frame needing de-flickering and use the Blend function to feather the correction between the ROI and the balance of the frame. The difference between the two methods is that the ROI is restricted to drawing a rectangle whereas a Mask can be drawn in any shape.

NOTE: Dissolves can be tricky for Zonal deflicker. It is suggested to exclude these frames from the marked range or place a cut (break) at the beginning and end of the dissolve and treat it as a separate shot with more conservative settings.

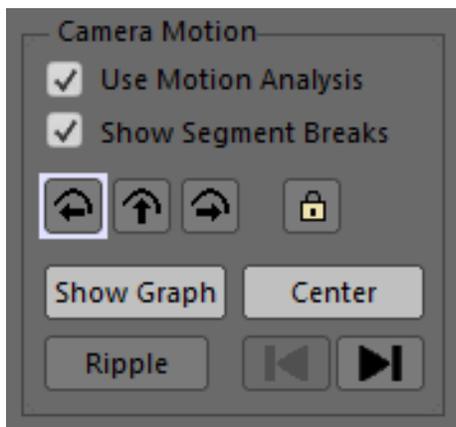
Using Motion Analysis with Zonal Deflicker

In order to use Zonal Deflicker with camera motion analysis, Cut Detection and Motion Analysis must be run for the clip prior to processing. Refer to: [Using the Motion Tool](#) for instructions on these steps and note that you can do Cut Detection and Motion Analysis concurrently if desired, but be aware that vetting the cuts to eliminate false positives and negatives is required prior to working in any tool that uses Cut Detection.

1. To proceed, enable the Use Motion Analysis and Show Segment Breaks checkboxes.

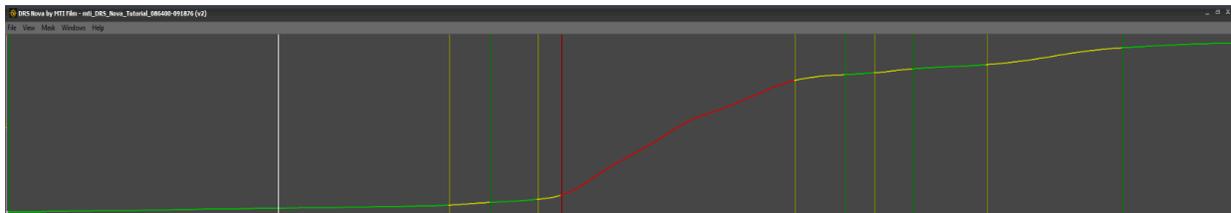
There are three Motion Type buttons: Green: Static, Yellow: Low, and Red: High motion separated by “segment breaks” that indicate the transition from one motion type to another.

Note: If “Use Motion Analysis” is left disabled, Zonal Deflicker ignores camera motion analysis.



2. Click the “Show Graph” button. The motion analysis graph will appear at the top of the UI with different color segments indicating their motion types.
3. Navigate to a shot in the clip.
Note it does not have to be the first shot in the clip.

4. To only show the current shot and its analysis, click the Center button or press Shift+C.



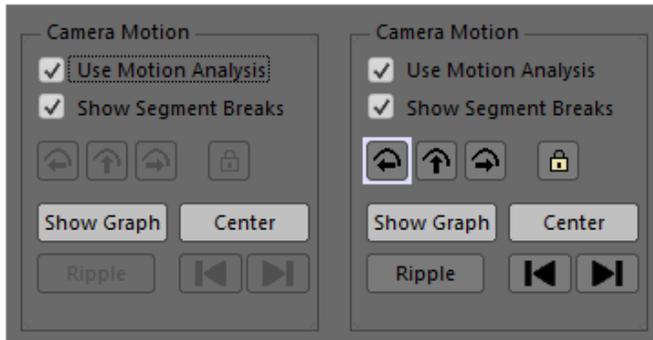
Navigating to Next or Previous Motion Segments

To move to the next motion segment in the current shot, press CTRL+SHIFT+F or click



To move to the previous motion segment in the current shot, press CTRL+SHIFT+S or click

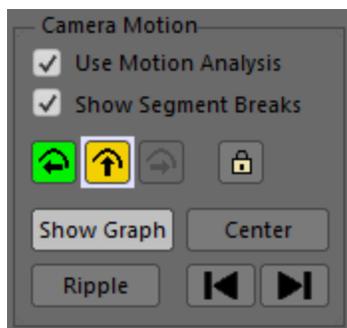




No Motion Analysis Present

Motion Analysis Present

If no motion analysis has been processed for a shot, all the buttons will be disabled. If motion analysis has been processed, motion types present in the shot will be represented by enabled motion buttons. When the timeline cursor navigates to a motion type, a white bounding box appears around the corresponding motion button. In the above example on the right, all three motion types are present in the shot and the timeline cursor is located on a Static segment as indicated by the white border.



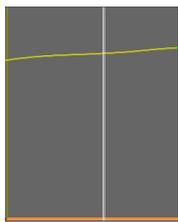
In this example a Static Motion button in the shot was enabled by the user and a Low Motion segment is currently enabled and focused as indicated by the white border. The High Motion button is disabled since this motion type does not exist in the shot.

The Lock button is enabled for use if desired.

If a motion segment type has been previously enabled but a matching one in the same shot is currently focused but not enabled, then its button will be shown disabled with a white border, for example:



Protecting and Locking Motion Segments



Locking a motion segment saves the current settings and protects it from any overriding command such as Ripple. To lock a single segment, navigate to the motion segment and press CTRL+L or click the Lock button . To unlock, repeat the action.

The status bar at the bottom of the segment will turn **Orange**.

To Protect matching segments in the shot, click the Ripple button

To Protect matching segments in the shot and clip, SHIFT+click the Ripple button.

Affected matching segments inherit the source's settings and are protected. Their status bar will turn **Orange**.

Disabling and Locking Motion Segments

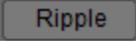
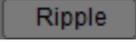


To disable and lock a motion segment so it will not be processed:

1. Click on the motion segment and leave the motion button disabled
2. Press CTRL+L or click the Lock button 

Setting Parameter Values for a Segment and Rippling them

After a segment's parameter values have been set, you can ripple the status to all matching segments in the shot and/or the clip. For example:

1. A shot has all three motion types, Static, Low, and High 
2. The user navigates to a Static motion segment and enables the Static button 
 - a. The segment's tool parameters are enabled and its Status bar turns **Cyan**.
 - b. The user sets tool parameter values for the segment.
 - c. The user clicks the Ripple button 
 - i. All matching motion segments in the shot are enabled and their Status bars turn **Blue**, indicating that their settings were copied from a neighboring segment
 - d. **Or**, the user can press SHIFT+click the Ripple button.
 - i. All matching motion segments in the shot are enabled and their Status bars turn **Blue**, indicating that their **settings** were copied from a neighboring segment AND...
 - ii. All matching motion segments in the clip are enabled and their Status bars turn **Magenta**, indicating that their **settings** were copied from a neighboring shot
3. The user Protects the segment by pressing CTRL+L or clicks the Lock button 
 - a. The Status bar for the segment turns **Orange**
 - b. The user clicks the Ripple button 
 - i. All matching motion segments' Status bars in the shot turn **Orange**, indicating that their **settings** were copied from a neighboring segment and locked.
 - c. **Or**, the user can press SHIFT+click the Ripple button
 - i. All matching motion segments' Status bar in the shot and clip turn **Orange**, indicating that their **settings** were copied from a neighboring segment or shot and locked.
4. The user navigates to Low and High motion segments and enables their respective motion buttons   and can then repeat the above steps.

Auto-Saving Segment Settings

The following conditions invoke Auto-Saving:

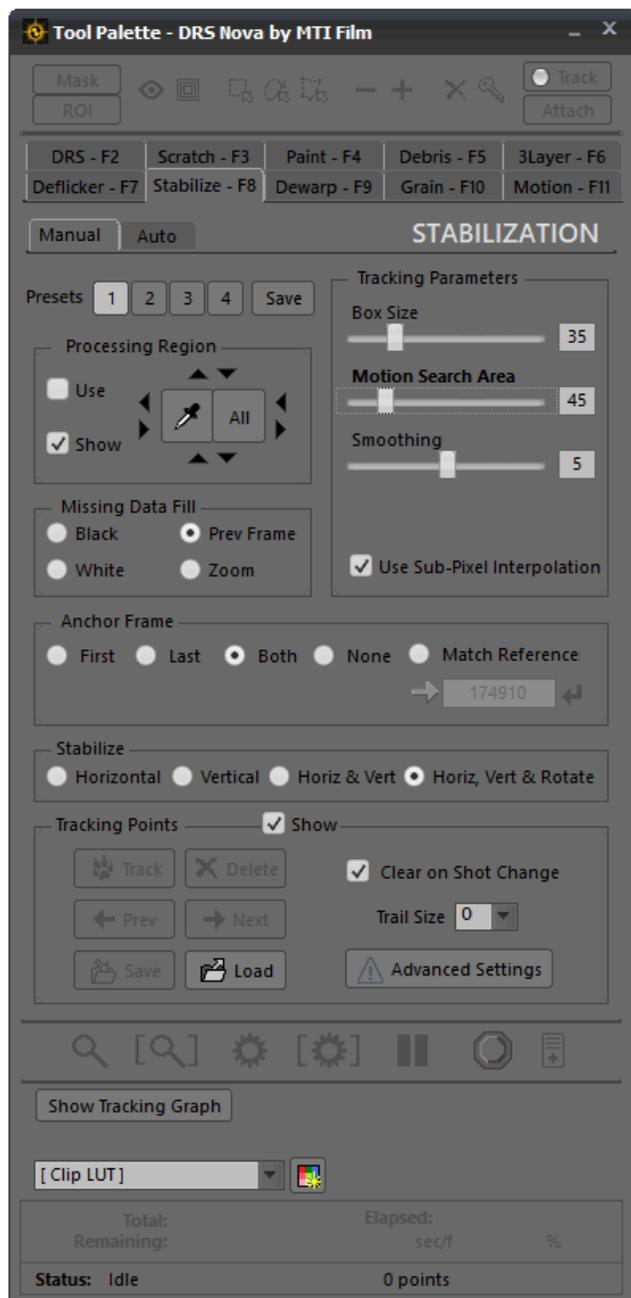
1. Navigating to another segment	6. Switching tools
2. Rippling the current segment	7. Switching clips
3. Locking the current segment	8. Previewing or Rendering
4. Disabling the current segment	9. Adding a shot to a PDL
5. Navigating to another shot	10. Exiting or Quitting the program

Zonal Module Hotkeys

Function	Keys	Note
Enable/Disable Mask Tool	SHIFT+i	
Toggle Visibility of Mask	CTRL+i	Preview and Render unaffected by visibility state
Show/Hide Mask Properties	CTRL+SHIFT+i	
Analyze Segment(s) of marked range	CTRL+G	
Toggle the Show ROI checkbox	CTRL+T	
Go to next cut	SHIFT+F	
Go to previous cut	SHIFT+S	
Commands		
Add Cut	N	
Remove Cut	CTRL+N	
Toggle Preview	T	Toggle pending fix and original values
Preview marked frame range in play mode after press the T key	SHIFT+V	SHIFT+V will play the marked range and allow you to stop and then jog, play, and toggle the T key.
Preview marked frame range	SHIFT+D	SHIFT+D will preview the marked range but you will have to press CTRL+Spacebar to stop
Render marked frame range	SHIFT+G	
PDL	<	Add event to PDL
Show/Hide Region Reticles	CTRL+T	
Lock Region Reticles	CTRL+SHIFT+T	
Stop Graph	CTRL+Spacebar	
Stop Render	CTRL+Spacebar	
Mouse functions		
Draw ROI	Left Drag	

Using the Stabilize Tool

The Stabilize tool is used to remove jitter, or weave, from sequential film images. The tool provides for the removal of weave on Horizontal, Vertical, and Rotation axes (X,Y,Z). When stabilizing on either the Horizontal or Vertical axis, one tracking point is all that is required. Adding rotation to the process requires two. There are two modes, manual and auto. The manual mode requires user interaction while the auto mode does not.



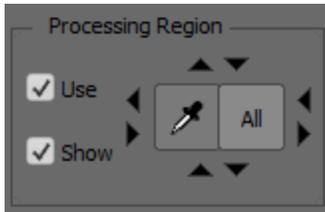
The Manual mode tool

Steps for Manual Stabilization

Hint: Create a version prior to using Stabilize since full frame replacements are generated. Right-click on the clip and select "Create New Version" from the context menu.

1. Processing Region

Use the Processing Region to restrict the processing of the frame to a region of interest as determined by the blue reticle. To enable the Processing Region press the 5 key or click the "Use" checkbox. If disabled, the whole frame will be processed.



To size the reticle, click on the up, down, left and right arrows. To move in greater increments hold down the SHIFT key. For smaller increments hold down the CTRL key.

If there is a black matte around the edges of the picture and you want to exclude it from processing, left-clicking on the matte using the Eye Dropper will automatically select the picture area and exclude the matte. You can adjust the reticle for more precision by zooming in and using the arrow buttons. The Eye Dropper can be enabled by either clicking on the button or pressing CTRL+SHIFT; in either case, the cursor will turn into the Eye Dropper icon. To reset the reticle to full screen, press the All button.



Note: CTRL+SHIFT is disabled in Auto-mode since it's used to navigate motion segments

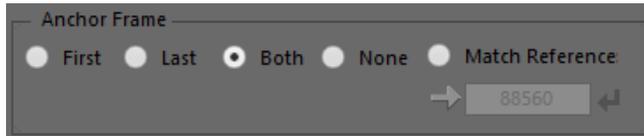


2. Establish IN and OUT Marks for Processing.

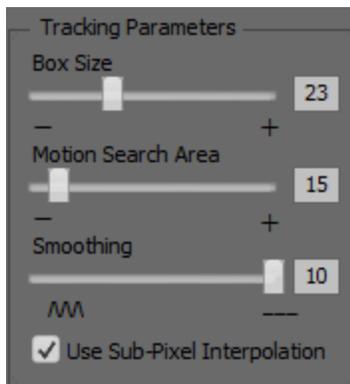
After marking the desired range, move to the Mark IN frame. In order to create tracking points, the current frame must be the Mark IN position.

3. Establish settings:

- a. **Anchor Frame** – Determines the frame reference(s) for Stabilization



*Hint: If a scene is static for the marked range, use the “First” or “Last” Frame as the Anchor. If the shot must be divided into sections for processing, perhaps because the tracking point needs to be re-established, use “Both” as Anchors.
(See “Using Tracking Offsets” below)*



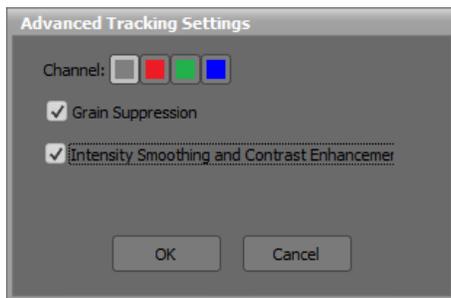
- b. **Tracking Box Size** – Determines the number of pixels to be tracked.
- c. **Motion Search Area** – Determines the area that will be searched for the tracked pixels.
Hint: The smaller the Motion Search Area, the faster the tracking.
- d. **Smoothing** – Smoothing affects the degree of motion-smoothing between all frames. The higher the value the more linear the fix. For example, if you wish to match the last frame of a marked range, you would enable “Last Frame” as the Anchor and set the Smoothing to the maximum value, 10 (ten).
- e. **Sub-Pixel Interpolation** – Without sub-pixel interpolation, corrections are made on a whole pixel by whole pixel basis. For more precision of the stabilization, enable the “Use Sub-Pixel Interpolation” checkbox.
- f. **Missing Data Fill** – Where the image is repositioned, the fixed frame will have missing data at either the top, bottom, or sides. Use the following to determine what will fill the missing data.
- White
 - Black
 - Previous Frame (recommended)
 - Zoom. Zooms the frames of the marked range based on the maximum correction.

4. Place a Tracking Point

Click on the image to place the point.

NOTE: If a rotation correction is needed, 2 tracking points are required.

Hint: The best locations for placement of points are hard corner edges or persistent, static specular highlights.



- a. If the tracking of a point(s) is not holding throughout the range, use the **Advanced Tracking Settings**.
 - i. Choose which channel to use (the default is luminance)
 - ii. Use Grain Suppression to reduce noise interference
 - iii. Use Intensity Smoothing and Contrast enhancement

5. Tracking the Points

Click the Track Button, or press the T key or CTRL+G. During the tracking process, the points turn Yellow. To see a “trail” the point takes during tracking, enter a value(0 - 64) in the Trail Size dropdown field. After tracking is completed, the points turn Green.

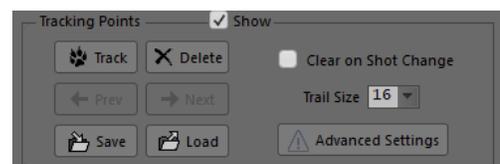
6. Preview or Render

- a. To preview the marked frame range press SHIFT+D or click on the Magnifier with Brackets button.
- b. To render the marked frame range press SHIFT+G or click the Gear with Brackets button. After rendering, the points turn Blue and are automatically saved.

7. Moving, Saving, Loading, Clearing Tracking Points

Moving

- a. Before tracking, if the “Clear on Shot Change” checkbox is disabled and a new Mark IN is established within the shot, the points will move to the new frame.
- b. After tracking, the points can be moved by remarking the In or Out or both marks to a different frame within the same shot. As long as the new marks are within the original tracked range, the track will be truncated to the marks and not require new tracking. However, if one of the marks falls outside the original tracked range, the points will move but will have to be tracked again.



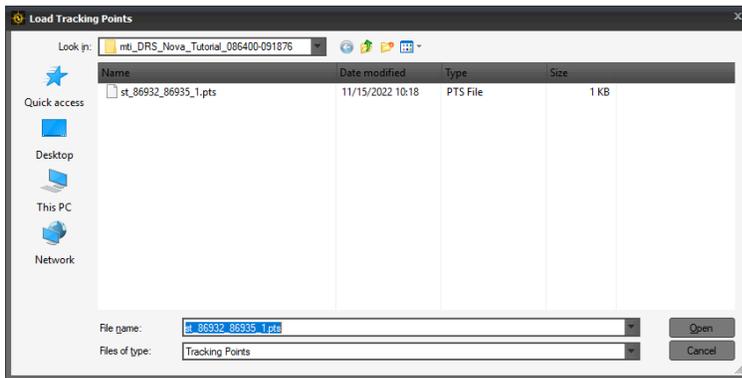
Saving

After tracking, DRS™Nova automatically saves and creates a file named “st_frame#in_frame#out_v#.pts”; for example, st_86932_86972_1.pts where “st” stands for Stabilization, 86932 is the mark in, 86972 is the mark out, and the 1 indicates the version of the tracked points.

The points can also be saved manually, which allows you to name the file as you wish. To save manually, press CTRL+S or click the Save button.

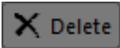
Loading

- a. To load points that were just tracked or rendered, press CTRL+L or click the Load button. The named tracking points file appears in the Explorer window and is preloaded in the “File name” area. Clicking Open loads the Tracking Points with the original IN and OUT marks.



- b. To load saved tracking points after marking a new IN point, press SHIFT+L. The tracking points will be loaded and located to the new mark IN.

Clearing Tracking Points

If the “Clear on Shot Change” checkbox is enabled, points are automatically cleared when a Mark IN is established on a new shot bounded by cut breaks. You can delete a tracking point by clicking it and pressing the A key or clicking the Delete button 

You can also clear all tracking points by pressing Shift+A.

Hint: Disable the checkbox when using the same tracking point(s) on a series of shots.

Using Tracking Offsets

Sometimes it is necessary to reposition a tracking point in the middle of a marked range. For example, the original tracking point has moved out of frame and needs to be relocated. You can move and reposition a tracking point(s) as an “offset”.

- i. Press the Spacebar key to pause the tracking process
- ii. Navigate to the frame where the point(s) will be repositioned and Left+click on the point you wish to relocate
- iii. Reposition the point to a new location within the frame and release the mouse button
- iv. Press the Spacebar key to resume tracking

You can do this as many times as necessary within the marked range.

Using Presets

You can save various setups using Presets.

1. Select a Preset number by clicking the corresponding button or pressing 1 through 4 on the keyboard.
2. Set the values for each of the available settings and press the Save button. To recall the preset, click the desired Preset button.

Note: To retain the current settings without loading the settings of the targeted preset, press and hold Shift prior to selecting the targeted preset number.

Using a PDL in Manual Stabilization Mode

If you wish to set parameters, including tracking point(s), for marked shot ranges but want to render them later, you can use the PDL (Process Decision List).

Adding one shot at a time to the PDL

1. Mark In and Out on a shot (press the H key if there are cuts on either side of the shot).
2. Press the , (comma) key or click the Add to PDL button 

Adding all shots in the clip to the PDL

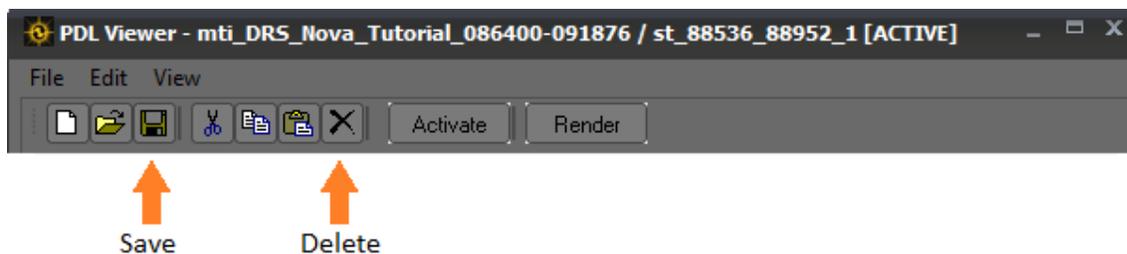
If cut detection has been run and validated, all shots found in the clip can be added to the PDL.

1. Press SHIFT+, (comma). All shots will be added to the PDL.
2. To delete a shot in the PDL, click on the shot and then press the Delete key or click the Delete button.

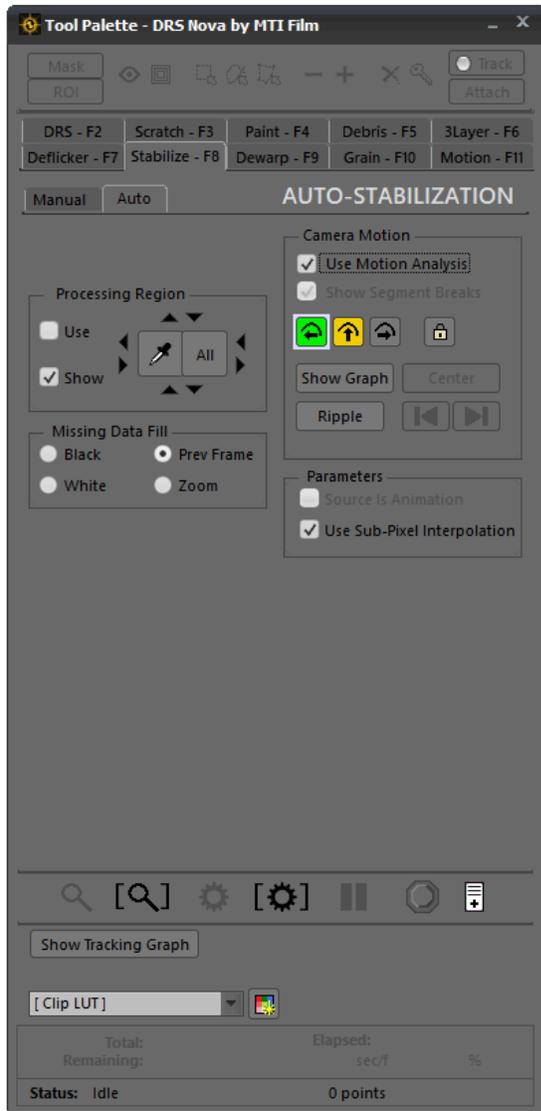
Note: For manual mode Stabilization, shots must have a tracking point(s) applied prior to adding them to the PDL.

Saving and Rendering the PDL

1. You can also save the PDL for later use or for safety. To save the PDL, place focus on the PDL Viewer and press CTRL+S or click the Save icon.
2. To delete an event, click on the event and press the Delete key or click the button.
3. When you've added all the events you want to the PDL you can render the PDL by clicking the Render button on the PDL Viewer window.



Auto-Stabilization



The Auto-Stabilization mode requires little to no user interaction. The tool consists of the Processing Region, Camera Motion Settings, Use Sub-Pixel Interpolation, and Missing Data Fill. It should be used with care and requires review after its use. MTI Film recommends that you always work in a version when using the Stabilization tool whether in Manual or Auto mode. Auto-Stabilization requires three steps:

1. Mark In and Out on a shot. If there are cut breaks on the timeline, press the H key to mark the whole shot.
2. Determine the parameters:
 - a. Processing Region
 - b. Sub-Pixel Interpolation
 - c. Missing Data Fill
3. Press the Preview (SHIFT+D) or Render button (SHIFT+G)

Whether you choose Preview or Render, Auto-Stabilization first does an analysis pass and then will Preview or Render.

Hint: The best way to use the tool is with a PDL. If cuts have been determined and vetted for all the shots in the clip, Press SHIFT+, (comma) to create a PDL with all shots included as individual events.

Source is Animation

If this option is enabled and the animation was recorded on 2s, the tool will attempt to discern the common frames and process them identically. However, if the animation has both 2s and 1s recorded it is best to disable this option as it can cause confusion.

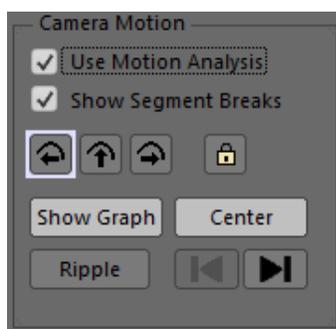
Using Motion Analysis with Auto-Stabilization

In order to use Auto-Stabilization with camera motion analysis, Cut Detection and Motion Analysis must be run for the clip prior to processing. Refer to: [Using the Motion Tool](#) for instructions on these steps and note that you can do Cut Detection and Motion Analysis concurrently if desired, but be aware that vetting the cuts to eliminate false positives and negatives is required prior to working in any tool that uses Cut Detection.

1. To proceed, enable the Use Motion Analysis and Show Segment Breaks checkboxes.

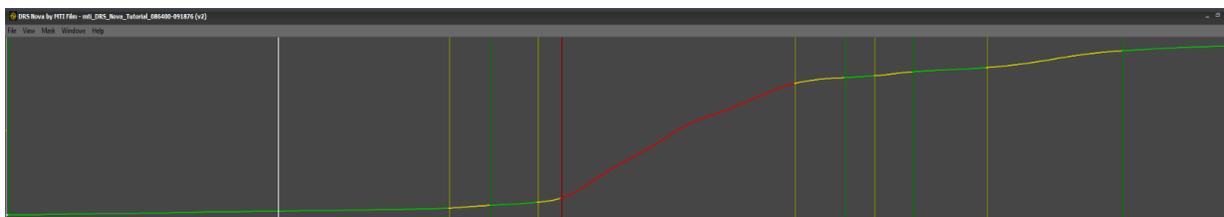
There are three Motion Type buttons: Green - Static, Yellow - Low, and Red - High motion separated by “segment breaks” that indicate the transition from one motion type to another.

Note: If “Use Motion Analysis” is left disabled, Auto-Stabilization stabilizes ignoring camera motion analysis.



2. Click the “Show Graph” button. The motion analysis graph will appear at the top of the UI with different colored segments indicating their motion types.
3. Navigate to a shot in the clip. Note that it does not have to be the first shot in the clip.

4. To only show the current shot and its analysis, click the Center button or press Shift+C.



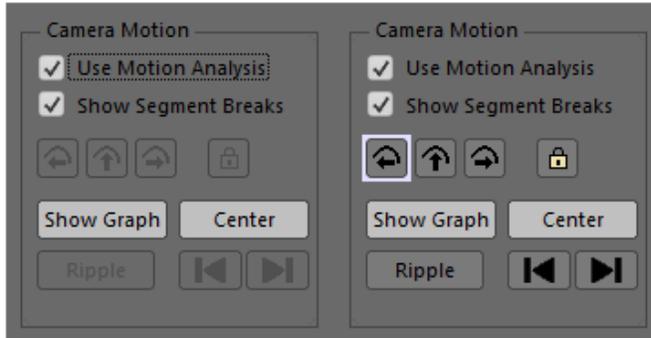
Navigating to Next or Previous Motion Segments

To move to the next motion segment in the current shot, press CTRL+SHIFT+F or click



To move to the previous motion segment in the current shot, press CTRL+SHIFT+S or click

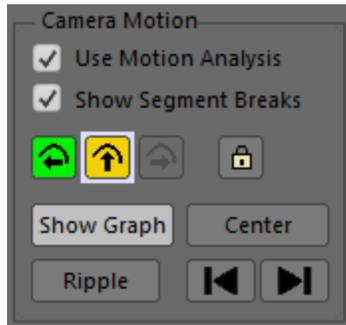




No Motion Analysis Present

Motion Analysis Present

If no motion analysis has been processed for a shot, all the buttons will be disabled. If motion analysis has been processed, motion types present in the shot will be represented by enabled motion buttons. When the timeline cursor navigates to a motion type, a white bounding box appears around the corresponding motion button. In the above example on the right, all three motion types are present in the shot and the timeline cursor is located on a Static segment as indicated by the white border.



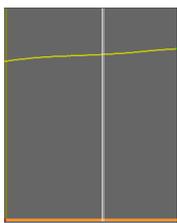
In this example a Static Motion button in the shot was enabled by the user and a Low Motion segment is currently enabled and focused as indicated by the white border. The High Motion button is disabled since this motion type does not exist in the shot.

The Lock button is enabled for use if desired.

If a motion segment type has been previously enabled but a matching one in the same shot is currently focused but no value has been applied or rippled, then its button will be shown disabled with a white border; for example:



Protecting and Locking Motion Segments



Locking a motion segment saves the current setting and protects it from any overriding command such as Ripple. To lock a single segment, navigate to the motion segment and press CTRL+L or click the Lock button . To unlock, repeat the action.

The status bar at the bottom of the segment will turn **Orange**.

To Protect matching segments in the shot, click the Ripple button

To Protect matching segments in the shot and clip, SHIFT+click the Ripple button.

Affected matching segments inherit the source's settings and are protected. Their status bars will turn **Orange**

Disabling and Locking Motion Segments



To disable and lock a motion segment so it will not be processed:

1. Click on the motion segment and leave the motion button disabled
2. Press CTRL+L or click the Lock button 

Rippling a Status

After a segment's parameter values have been set, you can ripple the status to all matching segments in the shot and/or the clip. For example:

1. A shot has all three motion types, Static, Low, and High 
2. The user navigates to a Static motion segment and enables the Static button 
 - a. The Status bar for the segment turns **Cyan**
 - b. The user clicks the Ripple button 
 - c. All matching motion segments in the shot are enabled and their Status bars turn **Blue**, indicating that their settings were copied from a neighboring segment.
 - d. **Or**, the user can press SHIFT+click the Ripple button.
 - i. All matching motion segments in the shot are enabled and their Status bars turn **Blue**, indicating that their **settings** were copied from a neighboring segment AND...
 - ii. All matching motion segments in the clip are enabled and their Status bars turn **Magenta**, indicating that their **settings** were copied from a neighboring shot.
3. The user navigates to a Low motion segment and enables the Low button 
 - a. The Status bar for the segment turns **Cyan**.
 - b. The user Protects the segment by pressing CTRL+L or clicks the Lock button 
 - c. The Status bar for the segment turns **Orange**.
 - d. The user clicks the Ripple button.
 - e. The Status bar for all matching segments in the shot turn **Orange**.
 - f. **Or**, the user presses SHIFT+click the Ripple button.
 - g. All matching motion segments in the shot and clip are locked and turn **Orange**.
4. The user navigates to a High motion segment and leaves it disabled.
 - a. The user Locks the segment by pressing CTRL+L or clicks the Lock button 
 - b. The Status bar for the segment turns **Red**.
 - c. The user clicks the Ripple button.
 - d. The Status bar for all matching segments in the shot turn **Red**.
 - e. **Or**, the user presses SHIFT+click the Ripple button
 - f. All matching motion segments in the shot and clip are disabled and turn **Red**.

Protecting and Locking prevents any subsequent user actions to change the status of the segments.

Note: In all cases where the user wants to ripple both the shot and the clip, SHIFT+click Ripple button will do both.

Note: In Auto-Stabilization, it is recommended to carefully enable High Motion segments since instability is generally masked during camera motion and the possibility of motion artifacts is greater.

Note: In the Auto Stabilization tool, settings are saved automatically.

Using a PDL in Auto-Stabilization Mode

Unlike the manual mode where each event needs to be added to a PDL discretely, Auto-Stabilization has three options:

1. Like the manual mode, if you wish to add each shot discretely to a PDL, mark the shot and then press the ,(comma) key or click the Add to PDL button 
2. Assuming that all shots have been reviewed and motion settings enabled, you can add the entire clip to the PDL as a single event.
 - a. Mark In on the first shot and Mark Out on the last shot.
 - b. Press the ,(comma) key or click the Add to PDL button 
3. Like the manual mode, if you wish to add all shots as individual events to a PDL press Shift+,(comma).

Stabilization Shortcut Keys

Function	Keys	Mode	Note
Add Tracking Point	Click on Image	Manual	
Center Shot for Motion Graph	SHIFT+C	Auto	
Save Manual Tracking Points	CTRL+S	Manual	
Go to Previous Motion Segment	CTRL+SHIFT+S	Auto	
Go to Next Motion Segment	CTRL+SHIFT+F	Auto	
Delete Selected Tracking Point	A	Manual	Click on Tracking Point to select, Press A
Delete All Tracking Points	SHIFT+A	Manual	Clears all Tracking Points
Track Object(s)	T or CTRL+G	Manual	
Preset 1	1	Manual	Use Shift to retain current settings and switch without loading the values of targeted Preset.
Preset 2	2		
Preset 3	3		
Preset 4	4		
Toggle Processing Region	5	Both	Toggle Use Processing Region
Cycle Anchor Frames	6	Manual	Cycles First, Last, and Both

Tracking Box Size	7	Manual	Use arrow keys or mouse wheel to adjust slider
Motion Search Area	8	Manual	Use arrow keys or mouse wheel to adjust slider
Smoothing	9	Manual	Use arrow keys or mouse wheel to adjust slider
Cycle Missing Data Fill	0	Both	
Commands			
Load Tracking Points and original marks	CTRL+L	Manual	Also used in Auto to Protect and Lock Segment
Load Tracking Points in place	SHIFT+L	Manual	
Toggle Protect and Lock/Unlock Segment	CTRL+L	Auto	Used with motion analysis
Toggle Disable and Lock/Enable Segment	CTRL+D	Auto	Used with motion analysis
Preview marked frame range	SHIFT+D	Manual	
Render marked frame range	SHIFT+G	Both	
Mark Segment In to Out	CTRL+H	Auto	CTRL+click segment graph also works
PDL - Add one shot	, (comma)	Both	Add shot to PDL
PDL - Add all shots	SHIFT+, (comma)	Both	Add all shots to PDL
Show/Hide Points	SHIFT+T	Manual	Toggles Show/Hide Tracking Points
Show/Hide Processing Region	CTRL+T	Both	Toggles Show/Hide Processing Region
Pause Render	Spacebar	Both	
Resume Render	Spacebar	Both	
Stop Render	CTRL+Spacebar	Both	
Select Eye Dropper	CTRL+SHIFT+Click	Manual	Click on black area for auto setting
Mouse functions			
Mouse Wheel		Both	Duplicates function of up/down arrows
Mouse Wheel	Press and hold ALT	Both	Duplicates function of left/right arrows

Using the Dewarp Tool

Dewarp provides for the correction of geometric distortions, or warping, induced by either optical or digital malfunctions. A common example of warping is the “frame bump” phenomenon caused when a bad splice or film notch gets caught on the edge of the film gate of a scanning device (such as a telecine or film scanner) as the film passes through. The resulting distortion causes an apparent geometric distortion over either a portion or all of the image.

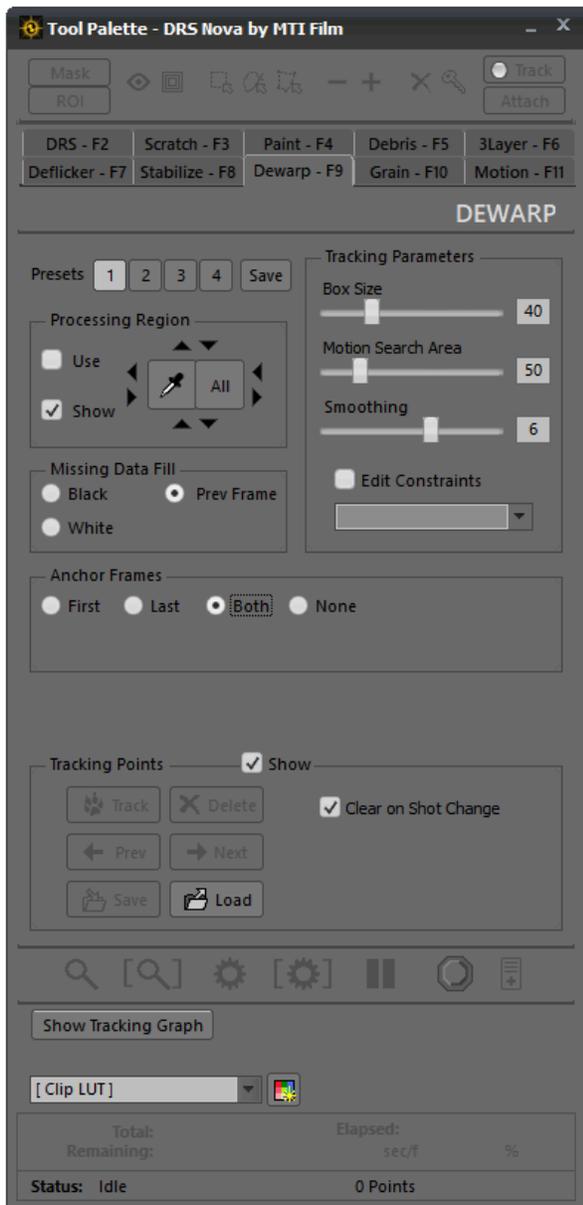
The normal process for correcting a warping effect is to first judge the number of distorted frames, and determine how many “Anchor” (or reference) frames will be used to provide “good” geometry information for the Dewarp algorithm to match. The Anchor Frames can be the First frame only, the Last frame only, Both the first and last frames or None.

Once the IN and OUT marks and the Anchor Frames are established, Tracking Points are placed on the frame in locations where the content has the best chance of being tracked. Corners, reflections, or anything that is static within the scene and can be contained in the Tracking Box’s area (even if it is the edge of a chair, for example) have the best chance of providing good tracking data. Generally speaking the more tracking points on a frame the better, but experimentation determines the best result.

“Smoothing” determines the amount of motion smoothing between all the frames in the marked range. The higher the value, on a scale of 0 to 10, the motion is more linear between the mark in and out. The lower the value, the original motion is respected. For example, if there is a camera pan or tilt, a lower smoothing value will still remove warping but remain faithful to the original camera motion. If the desired effect is to make every frame geometrically identical to the Anchor frame(s) then a higher smoothing value is best as long as it does not adversely affect the camera move.

Hint: Create a version of the clip so that original frames are not overwritten until ready to “commit” the result.

1. Establish IN and OUT marks for processing.
2. Move to Mark IN frame (SHIFT+E)
3. Click on the image to determine placement of Tracking Points
4. Establish settings for:
 - a. Tracking Box Size – Determines the number of pixels to be tracked
 - b. Motion Search Area – Determines the area searched for the tracked pixels
 - c. Smoothing – The degree of motion smoothing between all frames.
 - d. Missing Data Fill
 - i. White
 - ii. Black
 - iii. Previous Frame (recommended)
 - e. Processing Region - The area of the image that will be processed. Use the arrow buttons to adjust the area. (SHIFT for greater increments, CTRL for smaller). Use the Eye Dropper to sample the black level of a matte, if present, for better “Auto” function.



5. Choose the Anchor Frames.
 - Anchor frames serve as reference for the geometric correction of all frames between them.
 - a. Example: a 4 frame duration:
 - i. Using “Last Frame” will correct frames 1, 2 and 3 but not frame 4
 - ii. Using “Both” will correct frames 2 and 3 but not 1 and 4
6. Track the points. Click the Track Button, or press the T key or press CTRL+G
7. Preview or Render.
 - a. To preview the marked frame range press SHIFT+D or click on the Magnifier with Brackets button
 - b. To render the marked frame range press SHIFT+G or click the Gear with Brackets button

Save Tracking Points

Tracking points are automatically saved after each track process, but can also be saved manually. When you save Tracking Points the mark IN and OUT marks are also saved. The default name given to the file is the frame number of the mark IN point, and can be changed at your discretion. Press CTRL+S or click the Save button.

Load Tracking Points

- a. Press CTRL+L or Click the Load button. This function loads the Tracking Points and the original mark IN & OUT marks
- b. After loading the points, If you wish to move the marks to a different position within the shot, simply enter a new Mark In (E key). Retracking may be required
- c. You can also load saved Tracking Points to a new frame location by pressing SHIFT+L or SHIFT+click Load button

Clear on Shot Change.

If you wish to clear tracking points on the next shot, enable the checkbox. Disable the checkbox if you wish to process similar shots using the same tracking points positioned on the Mark IN of a new shot.

Using the PDL

If you wish to set parameters for marked ranges of the clip but want to process them later, you can use the PDL (Process Decision List).

1. Press CTRL+, (comma) or click Windows/PDL Viewer to open the PDL Viewer
2. Establish mark IN and OUT points. (press the H key if cuts are on either side of the shot)
3. Place the tracking points on the first frame of the shot
4. Add the shot to the PDL. Press the , (comma) key or click the PDL icon 
5. When all the events are added to the PDL, press the Render button on the PDL Viewer window.
6. To delete an event from the PDL, click on the event and press the Delete key or click the delete button located at the top of the PDL Viewer
7. If you wish to save the PDL for later use, place focus on the PDL Viewer and press CTRL+S or click the Save icon.

Using the Presets

You can save various setups in the Presets area. Select a Preset button number (1 - 4) and then set the values for each of the available settings and then press the Save button. To recall the preset, click the desired Preset button.

Note: To carry over the current settings without loading the targeted preset settings, press and hold Shift prior to clicking the preset number.

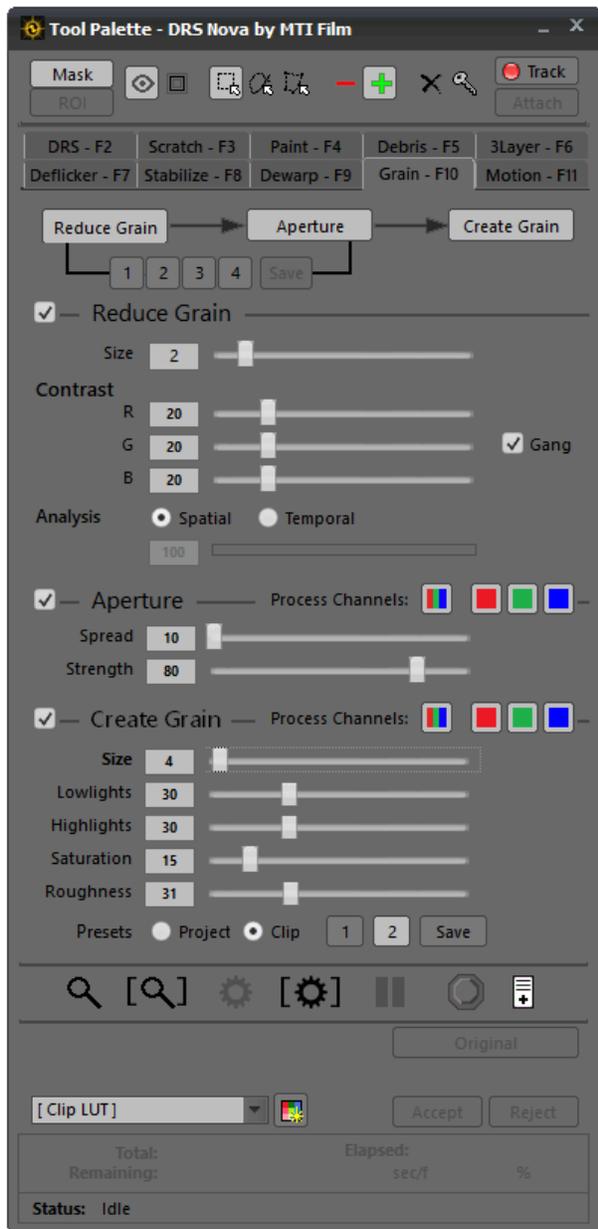
Dewarp Shortcut Keys

Function	Keys	Note
Add Tracking Point	Click on Image	
Save Tracking Points	CTRL+S	
Load Tracking Points	CTRL+L	Load Tracking points and original Marks
Load Tracking Points in place	SHIFT+L	Load Tracking points on current frame
Delete Selected Tracking Point	A	Click on Tracking Point to select. Press A
Delete All Tracking Points	SHIFT+A	Clears all Tracking Points
Track Objects	T or CTRL+G	
Preset 1	1	Use Shift to retain current settings and switch without loading the values of targeted Preset.
Preset 2	2	
Preset 3	3	
Preset 4	4	
Toggle Processing Region	5	Toggle Use Processing Region
Toggle Anchor Frames	6	Cycle through options
Tracking Box Size	7	Use arrow keys or mouse wheel to adjust slider
Motion Search Area	8	Use arrow keys or mouse wheel to adjust slider
Smoothing	9	Use arrow keys or mouse wheel to adjust slider
Missing Data Fill	0	
Commands		
Preview marked frame range	SHIFT+D	
Render marked frame range	SHIFT+G	
Processing Region Dropper	CTRL+SHIFT	Use dropper to determine region (for mattes)
PDL - Add one shot	, (comma)	Add shot to PDL
PDL - Add all shots	SHIFT+, (comma)	Add all shots to PDL
Mark Resume Frame	Enter	
Show/Hide Points	SHIFT+T	Toggles Show/Hide Tracking Points

Show/Hide Processing Region	CTRL+T	Toggles Show/Hide Processing Region
Pause Render	Spacebar	
Resume Render	Spacebar	
Stop Render	CTRL+Spacebar	
Select Eye Dropper	CTRL+SHIFT+Click	Click on black area for auto setting

Using the Grain Tool

The Grain Tool integrates grain reduction, aperture sharpening, and grain creation into a single tool.



The Grain Tool is divided into three functions: Reduce Grain, Aperture, and Create Grain.

Grain Reduce

There are two modes of operation for Grain Reduce based upon the type of temporal analysis desired.

1. **Spatial.** In this mode the Grain Tool does not do any temporal analysis and uses only spatial correction.
2. **Temporal.** This mode uses surrounding frames for temporal analysis.

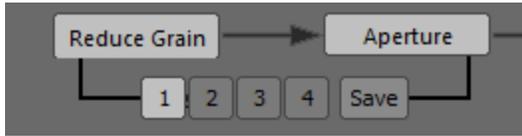
To enable/disable the Reduce Grain function, click the button, click the checkbox, or press the 5 key on the keyboard.

You can determine which channels to process grain reduction by simply disabling the “Gang” checkbox and entering a value of 0 to the channels not to be processed.

Aperture

The Aperture function is second in the processing pipeline for sharpening of the picture details. By default, it is disabled to avoid unwanted processing. It is best to experiment with the two sliders to find the optimum sharpening effect. To enable/disable the Aperture function, click the button, click the checkbox, or press the 6 key on the keyboard. You can also choose to process all or just a few of the color channels by clicking the desired buttons.

How to Save Presets for the Grain Reduce and Aperture Functions



There are four presets that can be saved for the combination of Reduce Grain and Aperture functions settings, or for one of the functions.

1. Make sure that the desired function(s) are enabled
2. Select a Preset button

Note: If, prior to selecting a Preset button, there are current settings you want to save, press Shift+click the preset button or press Shift+press the preset number key on the keyboard. This avoids loading the values previously stored in the preset and replacing the current ones.

3. Set the values for each of the functions
4. Press the D key to preview
5. Press T to toggle between Original and Processed
6. Click the Save button

Create Grain

The Create Grain function provides the opportunity to create grain that matches the various film stocks used in a project. For example, it is normally expected that there might be original camera negative and inter-negative dupes mixed on a single reel of film. Since each film element has its own grain structure, we recommend experimenting with the different settings and then saving them as Presets. To enable/disable the Create Grain function, click the button, click the checkbox, or press the 7 key on the keyboard.

How to Save Presets for the Create Grain Function



You can save two presets each for the Project and Clip.

1. Make sure that the Create Grain function is enabled. Press 7 key
2. Select Project or Clip. Press Ctrl+1 on the keyboard to toggle between the Project and Clip or click the Radio button. Press Ctrl+Shift+1 to toggle to retain settings of the current button.
3. Choose preset 1 or 2. Press Ctrl+2 on the keyboard to toggle between preset 1 and 2 or click the desired button. Press Ctrl+Shift+2 to cycle to retrain the settings of the current button.
 1. Adjust settings and press D to preview
 2. Press T to toggle between Original and Processed
 3. If satisfied, click the Save button

Using Mask in Grain

1. Enable the Mask mode if it is not enabled (SHIFT+I) or click the Mask button 
2. Choose the drawing tool
 - a. Press Q repeatedly to cycle through the drawing tools or click on the Rectangle, Lasso, or Bezier buttons.
3. Choose whether Mask is Inclusive (green) or Exclusive (red)
 - a. Press I to toggle between polarities Or, click on the green + or red – buttons.
4. Draw on the image. Left+Click and drag to draw. For Bezier, Left+Click to place individual points.

Using the PDL

If you wish to set parameters for marked ranges of the clip but want to process them later, you can use the PDL (Process Decision List).

8. Press CTRL+, (comma) or click Windows/PDL Viewer to open the PDL Viewer
9. Establish mark In and Out points. (press the H key if cuts are on either side of the shot)
10. To add one shot to the PDL, press the , (comma) key or click the PDL button 
11. To add all shots in the clip to the PDL, press SHIFT+, (comma).

Note: All shots will inherit the current tool values
12. When all the events are added to the PDL, press the Render button on the PDL Viewer window.
13. To delete an event from the PDL, click on the event and press the Delete key or click the delete button located at the top of the PDL Viewer
14. If you wish to save the PDL for later use, place focus on the PDL Viewer and press CTRL+S or click the Save icon.

Grain Tool Hotkeys

Grain / Aperture / Create Grain		
Function	Keys	Note
Preset 1	1	Use Shift to retain current settings and switch without retrieving values of selected Preset.
Preset 2	2	
Preset 3	3	
Preset 4	4	
Toggle Reduce Grain	5	
Toggle Aperture	6	
Toggle Create Grain	7	
Toggle Contrast "Gang"	8	
Toggle Analysis Spatial/Temporal	9	
Toggles through all sliders	0	
Toggle Grain Project/Clip Presets	CTRL+1	CTRL+SHIFT+1 will toggle without changing settings
Toggle Grain Presets - 1 or 2	CTRL+2	CTRL+SHIFT+2 will toggle without changing settings
Preview current Frame	D	
Render current Frame	G	After pressing D
Reject Preview	A	
Toggle Preview	T	Toggle pending fix and original values
Preview marked frame range	SHIFT+D	
Render marked frame range	SHIFT+G	
PDL - Add one shot	, (comma)	Add shot to PDL
PDL - Add all shots	SHIFT+, (comma)	Add all shots to PDL
Pause Render	Spacebar	
Resume Render	Spacebar	
Stop Render	CTRL+Spacebar	
Mouse functions		
Mouse Wheel		Duplicates function of up/down arrows

Thank you for reading and studying the manual for DRS Nova version 5.5