



Phantom Cine Toolkit  
for Final Cut Studio

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## System Requirements

### Minimum Hardware and Software Configuration

- Intel Macintosh
- Mac OS X 10.5.8
- QuickTime 7.6.6 (or later)
- 1280 x 1024 display
- Final Cut Studio 3

### Recommended Hardware and Software Configuration

- 12-Core Intel MacPro System
- Mac OS X 10.6.4 (or later)
- QuickTime 7.6.6 (or later)
- 4 Gigabytes of RAM or more
- Dual 1920 x 1200 displays
- High Speed storage, such as a SAS RAID, SATA2 RAID, Fiber-channel RAID or SAN.
- Final Cut Studio 3

### Playback Requirements

Vision Research's Phantom Cine files contain uncompressed raw sensor data from their cameras. As a result, Cine movies often range from 30-60 Megs to multiple Gigabytes in size. Movies that were created by these cameras with resolutions smaller than High Def will play with ease on many G5 based PowerPC systems. Phantom HD and Phantom 65 Movies will likely require machines with better performance. It is suggested that a minimum of 8-Core Mac Pros be used.

Playback of Phantom Flex, Phantom HD and Phantom 65 movies will also require systems with high speed storage. At minimum, a dedicated SATA2 storage array, SAS Storage array, or 4G/b based directly attached Fiber-Channel storage is suggested.

## Overview

### QuickTime Components

The Phantom Cine QuickTime Components will perform all of the importing, playback, de-bayer, white balancing, and color correction functions to the movie. All applications that use Apple's QuickTime libraries can access all aspects of the Phantom Cine files. Applications ranging from Final Cut Pro right down to iMovie, can import and play these files without any sort of conversion or preprocessing steps.

There are no direct "controls" or programs to launch in order to use these components. Your QuickTime enabled applications will simply "recognize" the Cine movie files as another movie format that can be used. Your Macintosh will also be "aware" of the files, much the same way QuickTime movies are already available to the system. Simply single-clicking on a Phantom Cine file in Finder, allows you to see a thumbnail of the image, for instance.

### System Preferences

The Glue Tools PhantomCine preference pane is where you pre-set all of the global settings that the components use. These settings include white balance modes, de-bayer algorithms and color conversions. The panel also handles licensing information, Time Code support and more.

### Final Cut Pro Plugins

With a purchased license, you will see the Final Cut Pro plugin in the File->Import menu. The plugin will be labeled: "Glue Tools Phantom Cine Sequence Import." You will select this menu item to import a Phantom Cine movie into FCP as if it were a regular QuickTime movie clip. Shift Selecting folders containing a number of Cine files, will let you load a number of clips at once.

Also included is an FxPlug Filter for altering the Phantom Cine's Color Mathematics. This works inside Final Cut Pro and allows you to alter color on a clip by clip basis.

### Spotlight Plugins

The Spotlight Plugins enable your system to see inside the Phantom Cine header. The Finder can extract specific information from the Phantom Cine files when it does a "Get Info." You can search for camera models, encoding characteristics, or even "shot notes" from the user modifiable "description field" from the Finder's Spotlight panel. Simple shell scripts can also take advantage of the spotlight services and sift through frames for specific data.

## Installation and Demo Mode

### Installation

Installation is performed by double-clicking on the installer package, and selecting the boot disk that you want to install the components onto. Once installed, you will need to reboot your machine. Everything QuickTime needs to work with Phantom Cine files is installed into the Operating System.

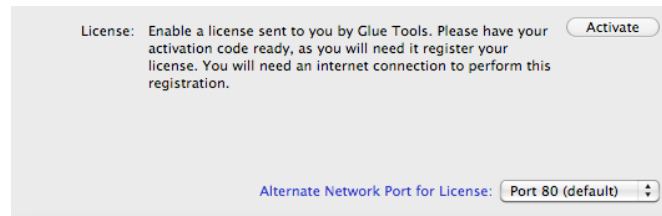
### Demo Restrictions

If no license is purchased, the Phantom Cine Images are drawn and exported with a large colored bar through the center of the image. When the license is purchased, the bar will disappear. Time Code will report back a start time of 09:09:09:00 and the frame rate will be fixed at 24 FPS. The Final Cut Pro Panels will also have limitations. The frame ranges will be limited from 888 to 999, the file name will be forced to a single filename, and most of the controls will have no effect. Once a license has been installed, all features will work as expected.

## Licensing

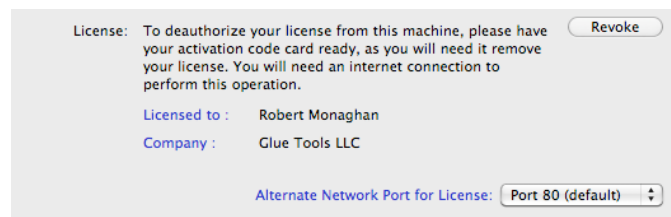
### License Activation

**Licensing must be done while connected to the Internet.** If you do not have an internet connection, you will not be able to activate the license. In many cases any type of network connection will get you up and running. Once activated, you will not be required to have a network connection, **unless you want to move the license to another Macintosh.**



To activate the license, you will need the Registration Code that was emailed to you. Open the System Preferences, and click on the Phantom Cine preference pane. Click on the "Activate" cut and paste Registration Code into the panel, and then cut and paste the encryption string from the email, into the "Activation Code:" section window. At this time, the software will verify the license with our server, and create a permanent license for you. Until you decide to move the license, this will be the only time that the internet is used for licensing.

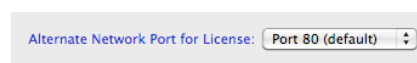
### Revoking/De-authorizing a License



If you need to move a license to another machine, you can use the same license code to "Revoke" the license from the machine that you are on. Just as you had done with the Activation, Open the System Preferences-->Phantom Cine preference pane. Open the Info tab and click on the "Revoke" button. You can now cut and paste the same activation code into the "Activation Code:" panel. Once deactivate, the license will be free so that another machine can be used.

### License Troubleshooting

If you encounter a problem with your licensing because of network issues, consult with your IT Dept. The most common cause of problems is a blocked internet port or a Firewall Proxy system. The licensing can be modified to use one of 2 internet ports: Port 80, which is the default port or Port 44333 (an alternate port). Select either of these ports to try to perform a license authorization.



If the problem persists, email [support@gluetools.com](mailto:support@gluetools.com) for further assistance.

## Quick Start Guide

### Important Notes about Phantom Cine File Format

Vision Research has been in business for a number of years, building high speed digital cameras. As time has gone on, the camera capabilities have greatly improved. As a result, each generation of camera has required the Cine file format to expand and change. Vision Research's more modern cameras create Cine movies that have a different image payload from the cameras that the company originally built several years ago. As a result, some legacy cameras create a movie file that is not supported with this software.

The Phantom Cine Toolkit currently supports the following cameras: Phantom Flex, Phantom 65, Phantom HD, Phantom Flex, v12, v10, v9x, Miro series, and v7x cameras. Earlier camera models are not supported. When the Phantom Cine Toolkit is installed, you can do a "Get Info" on Cine file, and see which camera model created the Cine file.

### File Naming Convention

Along with the fact that some cameras have a long life-span, the software that the cameras uses, has also gone through a few changes. One change that is important to this package is the way that the files are named. Originally, the software for these cameras used DOS and early versions of Microsoft Windows. Because of this, files could only have a three character file extension. As a result, the camera software would create files with an extension ".cin" (such as "my-movie.cin"). This conflicted with another widely used file format in the Motion Picture Industry (the Cineon file from Kodak). To make life easier, Vision Research has now changed the extension of the files so that they are created with the new ".cine" extension.

This is important as the Phantom Cine Toolkit will only open files with a ".cine" extension. Files with a ".cin" extension will be confused with the Cineon file format. So, if you are using older Phantom Camera software from Vision Research, check to see that the extension is set properly.

### Exporting a New Movie from QuickTime Player

For the ease of portability with other users, you can quickly and easily convert a Phantom Cine Movie to any other QuickTime Movie format. You can do this by opening a Phantom Cine Movie, using QuickTime Player, and then selecting the "File->Export...." Select your codec, location and filename as you would with any other movie, and start the export. It is that easy.

### Importing a Sequence into Final Cut Pro

Final Cut Pro has a specially built interface to work with the Phantom Cine files. To import the footage, select the "File->Import->Glue Tools Phantom Cine Import...". Locate a Cine file, and click "Ok." Your sequence will now appear in the browser, complete with the file's metadata.

That's it!

You can now drag the sequence onto the timeline to edit

### Importing a Movie into After Effects CS5

Adobe's After Effects CS5 now provides QuickTime compatibility with Third Party QuickTime components. You can select the "Import->File..." menu, to import a Cine file. Be sure that you "Enable: QuickTime" if you are not able to select ".cine" movie files.

That's it!

You can now import the Phantom Cine footage into your After Effects Project.



## Phantom Cine Toolkit Reference

This package consists of a number of parts that make up the whole: the Phantom Cine QuickTime components, a System Preferences Pane, and a Spotlight Plugin. Each of these pieces are briefly described in turn.

### Preference Pane

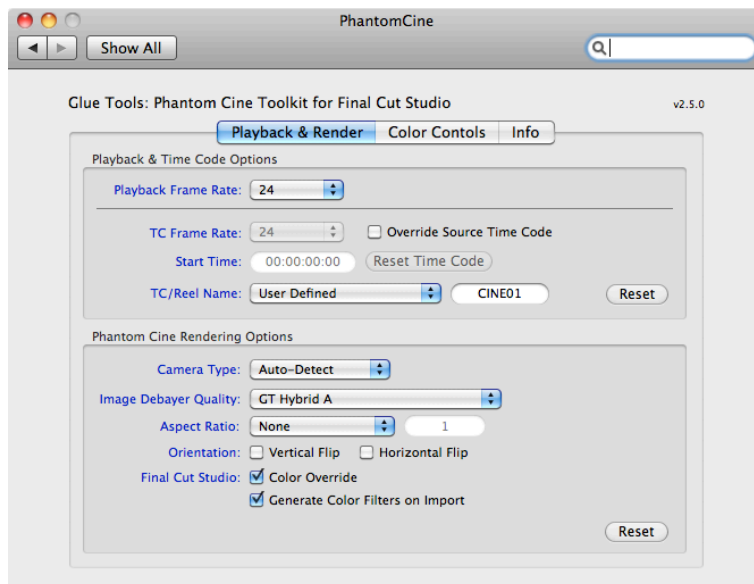


The Glue Tools Phantom Cine Preferences Pane is where you can change the settings used by Phantom Cine QuickTime Components. If you want to change the white balance settings, use a LOG90 gamma curve, or enable Time Code settings, you can do it with the System Preferences Panel.

Let's begin by opening the System Preferences, and clicking on the Glue Tools Phantom Cine preference icon.

### Playback & Render

You will notice that the Presets Tab is divided into two sections: A "Playback & Time Code Options" section, and a "Phantom Cine Rendering Options" section.



### Playback & Time Code Options:

#### Frame Rate

This lets you set the frame rate for video playback, you can choose from several different popular frame rates from around the world. Applications will use the value that you choose.

#### Override Source Time Code

When enabled, you can alter any of the Time Code settings. Many of the settings are disabled until you enable this check box. When it is disabled, Time Code is automatically generated using the IRIG timecode start frame that is stored inside the Cine file.

#### TC Frame Rate

This lets you override the time scale that the Time Code track uses. This can be different from the playback Frame Rate. This control, combined with the playback Frame Rate pop-up can let you simulate a Tele-cine operation. i.e.: selecting a 24 FPS for the playback Frame Rate and a 25 (or 29.97) for the Time Code.

### Start Time

When enabled, you can enter in your own Time of Day start time. You can click on the “Reset Time Code” button to bring it back to 00:00:00:00

### TC/Reel Name

The “TC Source Labeling” Pop-up menu determines how QuickTime identifies the Time Code track. You can type in your own text into this box, or use one of a number preset options in the menu.

“User Defined” allows you to type your own description into the text field below. When selected, you are able to type in up to 12 characters, which will be used as the Reel Name. You can use either the “Root” file name from the first frame, or you can use the parent directory that the frames are stored in, as the reel name.

## Phantom Cine Rendering Options:

### Camera Type

This pop-up menu is used to select the default camera model. In just about every case, you can leave this on “Auto-Detect.” However, if a Cine file is damaged or incomplete, you can force the software to use the settings for a specific camera model.

### De-bayer Mode:

This pop-up menu is used to select the type of de-bayer algorithm to be used to interpolate the sensor data. Different de-bayer modes will concentrate on a specific “look” when creating an image. Some modes will simply “average” the sensor pixel values to estimate the RGB values. Other de-bayer algorithms are much more elaborate, carefully examining each pixel to best handle gradients, hard edges, and color changes. Naturally, the more elaborate the de-bayer algorithm, the more processing speed is needed by the software. On slower machines, de-bayer algorithms such as “Variable Gradient” will significantly impact playback. However, this type of algorithm is ideal when exporting to another QuickTime movie format.

De-bayer performance is sorted by their order in the menu. The top mode menu item, “Raw Sensor Data Mode” is the fastest, as no de-bayer algorithm is being applied. “Nearest Neighbor,” “Bilinear Interpolation” are the next fastest modes. The slowest yet most accurate is “GT Hybrid A” which is at the bottom of the menu.

### Aspect Ratio

This setting will let you alter the aspect ratio of the image, based upon presets, or your own aspect ratio value. The ratio changes the height of the image, based upon the value you enter and the width of the image.

### Orientation: Vertical Flip / Horizontal Flip

Enabling or disabling each of these checkboxes will cause the image to be flipped vertically or horizontally.

### Final Cut Studio: Color Override

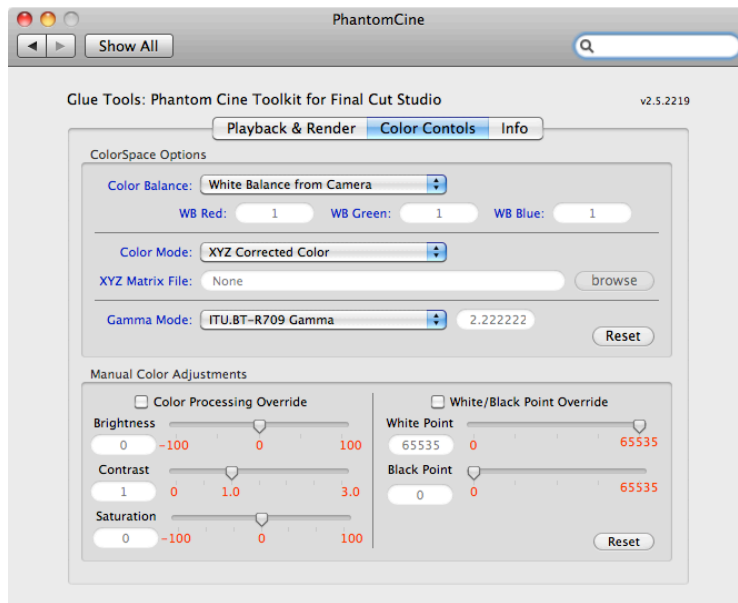
This checkbox will cause each Phantom Cine file to open without using its color information. It is used in conjunction with the Phantom Cine FxPlug filter, to allow you to modify the way the Cine is rendered inside Final Cut Pro.

### Final Cut Studio: Generate Color Filters on Import

This checkbox causes the Import->Glue Tools Phantom Cine Import plugin to automatically create an FxPlug Filter as each Cine is imported. As the Cine is imported, the filter will have each of its settings adjusted to match what is inside the Cine’s header.

## Color Controls

This tab provides the ability to preset the way the Color will be processed inside the Phantom Cine Toolkit. These settings are Global, meaning that every Cine loaded, will be affected by these settings. The only exception is the Phantom Cine FxPlug Filter in Final Cut Pro.



### ColorSpace Options:

#### Color Balance

This pop-up menu is used to active various white balance modes. The default is “None,” disabling any white balance processing that might be needed. The other options are “White Balance from Camera,” which takes the white balance values embedded inside the Phantom Cine file, and “White Balance from Values,” which allows you to manually enter values into the WB Red, WB Green and WB Blue fields. These fields will be activated when “White Balance from Values” is enabled.

#### Color Mode

This pop-up menu is used to choose a color correction mode. You are provided with the choices of using “Raw Color,” “XYZ Corrected Color” or “XYZ Corrected Color from File.”

Raw Color mode removes all color correction done on the imagery. The raw sensor data is providing the color as it was captured.

XYZ Corrected Color mode uses an internal table, developed by Vision Research, to adjust the chromaticity for each camera model. As each model of camera uses a different model of sensor, each model will capture color with a slight difference. This difference is measured, and the XYZ tables can be used to correct for that difference.

XYZ Corrected Color from File mode lets you, the user, to develop your own XYZ table, to correct for sensor differences. A sample file is included with this package, to show you how set up your own color correction. For more information on how to create your own XYZ Color Correction, go to the Glue Tools Support forum and post a message. Someone will contact you with more information. Once you have created your XYZ Color Correction Matrix, you can select the file with “Color Matrix” field. Click on the “Browse” button to locate your file. Once it is selected, the Phantom Cine components will use the file to perform the correction.

For those users that wish to adjust the color correction matrix themselves, can create an XML file with the appropriate settings.

The layout of such a file is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple Computer//DTD PLIST 1.0//EN"
    "http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
    <key>CineColorMatrix</key>
    <array>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
        <real>1.0</real>
    </array>
</dict>
</plist>
```

This file describes the matrix that can be applied to your Cine movie. The file can be named anything you want. It is suggested that you use the .xml file extension. The only section that should be altered is the numbers between the <real> </real> tags.

The values are positioned in this order:

```
red - red
red - green
red - blue
green - red
green - green
green - blue
blue - red
blue - green
blue - blue
```

Feel free to submit your own matrix creations to our support site!

#### Gamma Mode

This popup menu will let you select from a variety of Gamma curves built into the Filter. You can preset from a Gamma from the Cine file header, Choose your own Gamma value, or use Pre-Generated Gamma Curves such as Rec709, Log90, sRGB or plain old "Linear".

## Manual Color Options:

### Color Processing Override

When enabling this switch, you are overriding the settings that were saved into the Phantom Cine header file. This can be useful, when the photographer accidentally placed a bad setting into the file. Or, perhaps a creative choice is needed to achieve a specific look. When enabled, the following controls are available:

### Brightness

This slider allows you to enhance the brightness of the images during playback. At 0 the brightness is what is considered "normal." Anything less than 0 will darken the image. Values higher than 0 will "brighten" the image.

### Contrast

This slider allows you to change the contrast of the images during playback. At 1.0 the contrast is what is considered "normal."

### Saturation

This slider allows you to change the saturation of the images during playback. At 0 the saturation is what is considered "normal." Sliding towards -100 will desaturate the image. -100 will completely desaturate the image to black and white. Sliding towards 100 will completely saturate the image.

### Black & White Points

These sliders will allow you to clip the upper and lower limits of the color range for each Red, Green and Blue Channels. The defaults are 0 for Black, and 65535 for White. Reducing the White Point, will lower the maximum "white" threshold. The Black Point can be raised, as well.

## Info Tab

In the "Info" tab, you can click on links to the Glue Tools website, as well as direct links to the Support/FAQ pages, and the Registration pages. If you wish to purchase a license for the Phantom Cine Package, visit [www.gluetools.com](http://www.gluetools.com), "purchase" page and follow the instructions there.

## Final Cut Studio Reference

### Final Cut Pro “Phantom Cine Import” Plugin

Final Cut Pro users can now import Phantom Cine footage with a dedicated Import Panel. This panel can easily be accessed by selecting the “File->Import...” menu. In this menu you will see a new item “Glue Tools Phantom Cine Import...”

The Phantom Cine Import panel for Final Cut Pro provides most of the same controls that the Phantom Cine Preference Pane does. However, the panel adds the ability to extract metadata right out of the Phantom Cine file, and place the information right into your FCP project. Shot notes, color information, and other information is extracted and available in the XML that FCP generates.

### Final Cut Pro Sequence Presets

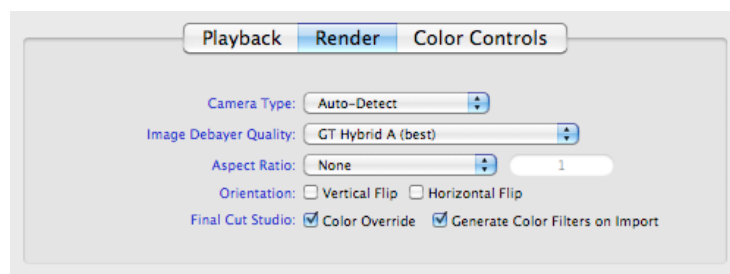
Final Cut Pro provides a set of “Sequence Presets” which allows you to quickly configure your system for different editing scenarios. Included with the package is a set of predefined Sequence Presets. These are generic presets for standard frame rates, and image sizes. As with the other Sequence Presets that Apple provides, you can duplicate and customize these to suit your needs.

Also included with these Sequence Presets, is a set of AJA Kona3 specific Sequence Presets. These presets allow you to preview your footage out through the Kona 3 hardware.

### Phantom Cine Color Processing FxPlug Filter

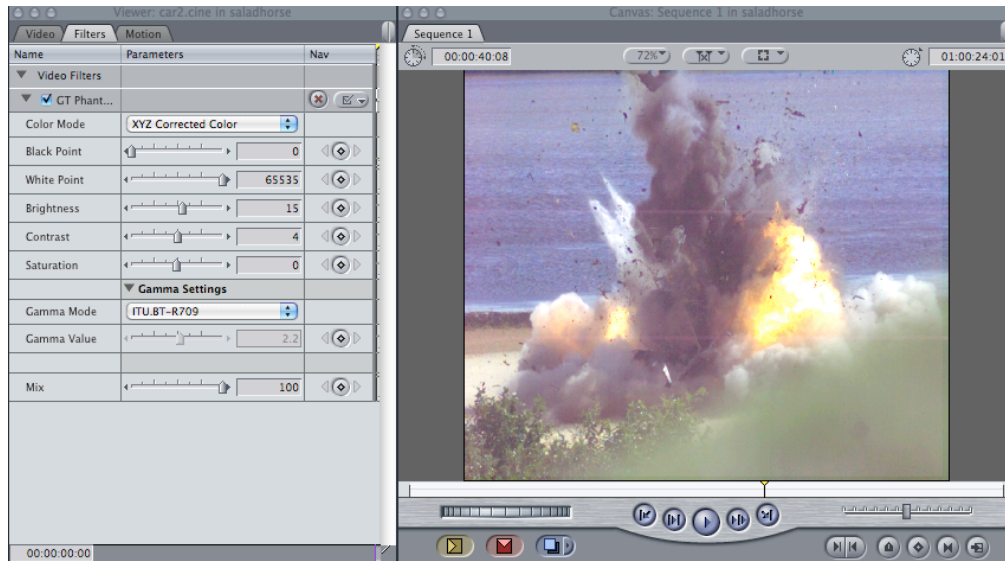
Final Cut Studio provides developers with a plugin technology for manipulating your image. We have developed plugins to let you adjust your Phantom Cine footage using the very settings from the Phantom Cine file.

To get started, select Import->Glue Tools Phantom Cine Import... but before importing some Cine files, click on the “Render” tab and make sure that “Color Override” and “Generate Color Filters on Import” enabled.



Now, you can go ahead and import a clip. When the Cine is in the browser, double click on it. This will display the file in the Browser:Slug window. Along the top is a bunch of tabs. Click on the “Filter” tab. This will display the newly attached Phantom Cine FxPlugin. With this plugin, you can modify the color as you see fit.

When you imported the Cine file, the header of the file was read as well. Using the settings from the file, the newly created Phantom Cine FxPlugin was preset with all of the needed settings. This will provide you with a starting point from which you can make adjustments.



Drag your Phantom Cine clip onto the timeline and double click on it. Then select the “Filter” tab from the top of the Browser:Slug window. You will be presented with a list of sliders and pop-up menus. A description of each control is provided below. The best way to learn what they do, is to try them out. As you make each adjustment, you can see its effect on the right side of the display.

A feature of these plugins is that you can duplicate the Cine file on the timeline several times. If you had three copies of the same Cine file on the timeline, each of the three could have different FxPlug settings. Ideally suited when you are trying to make creative color decisions in your project.

The settings are as follows:

### Color Mode

- This pop-up lets you enable or disable XYZ Color Space processing, if used. (Not all Cine files use this.)

### Black Point/White Point

- These sliders allow you to adjust the black and white point from which the filter will process between. The default is from 0 to 65535.

### Brightness/Contrast/Saturation

- Each of these sliders will adjust the image as described. These settings will be populated with the settings stored in the Cine file’s header.

### Gamma Mode

- This pop-up menu will let you select from a variety of Gamma curves built into the Filter. You can preset from a Gamma from the Cine file header, choose your own Gamma value, or use Pre-Generated Gamma Curves such as Rec709, Log90, sRGB or plain old “Linear.”

These settings are stored inside the Final Cut Pro project file. Nothing that you adjust here will affect the Phantom Cine file. The changes are non-destructive.

## MacOSX Reference

### Macintosh Finder / Get Info

Get Info (Command – I) in the Finder allows you to view the details of any Phantom Cine file, as well. Much like the Spotlight window, you can get info about a single file, that you happen to click on.

The Get Info panel will display Phantom Cine specific information in the header of the selected files. This is an excellent diagnostic tool when working with the Phantom Cine file format.

### Spotlight

Phantom Cine files can be indexed and searched by Spotlight. Simply typing in a relevant bit of text, into the Spotlight text field, will search all of the Phantom Cine metadata on your system, and locate the associated frames. For instance, if you have some notes saved inside the “Description” field of the Cine file, you can search for a keyword, and have the movie located.

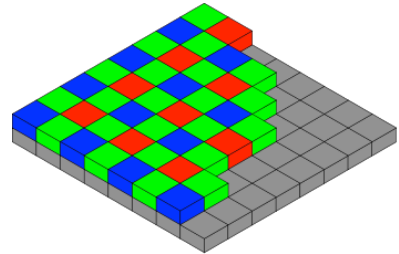


## Terminology

Here is some terminology that you may not be familiar with.

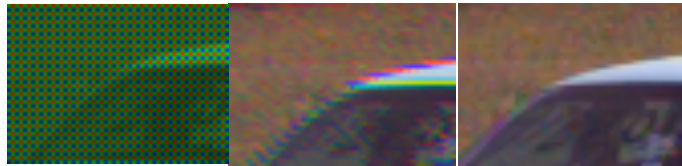
### Bayer Pattern

Traditionally, you would assume that each pixel is a combination of Red, Green and Blue channels to make each pixel. With single sensor digital cameras, each pixel is in-fact a single color. The "Bayer Pattern" was invented by Dr. Bryce E. Bayer at Kodak, who came up with the "bayer pattern" color filter array. He came up with the way each color is arranged on the camera sensor (see attached graphic). Each line on the sensor contains alternating pixels of Green and Red, and the next line below alternates Blue and Green. By using a "de-bayer" algorithm, a proper RGB image can be reconstructed.



Different types of de-bayer algorithms will reproduce different levels of image quality. Typically, "fast" de-bayer algorithms are of a poor quality. "Slow" algorithms are typically much better. (Image courtesy of Wikipedia).

Here are examples of some de-bayer algorithms. On the left, is a "Raw" Bayer Pattern. In the centre is a "fast" Nearest-Neighbour de-bayer pattern and on the right a "slower" Pixel Grouping de-bayer pattern. As you can see, there will be a substantial quality difference, depending upon the de-bayer algorithm you choose. Our best de-bayer mode is also our slowest. GT Hybrid A will render a very nice image. However, playback is probably not possible on current 8-core systems. Pixel Grouping is the highest quality de-bayer algorithm, which will permit playback. Naturally, as computers improve, we will take advantage of them to increase performance.



## Technical Support

Support for these tools can be obtained by posting questions in the User Forum at [www.gluetools.com](http://www.gluetools.com).

Online support also includes an FAQ section. The User Forum is a great place to ask your own questions, if you can't find the answers. The User format is located at: <http://www.gluetools.com/FUDforum2/index.php>

Emails for help can also be sent to [support@gluetools.com](mailto:support@gluetools.com). Detailed consulting for specific features and improvements is also available on a case by case basis. Please contact us with your specific needs.

Support is available Monday – Friday, 9AM to 5PM PST/PDT.

Questions regarding XYZ Matrices for specific Vision Research cameras, should be directed to Vision Research's technical support. Visit <http://www.visionresearch.com> for more information.