

## 1394 Camera Java Package for ImageJ

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# Getting Started

## Introduction

This manual describes the 1394 Camera Java Package for ImageJ.

## Features

The program features include:

- Allows frame capture, providing scientific quality color and grayscale video images using Scion Monochrome and Color FireWire cameras.
- Provides Java classes, which may be invoked from custom ImageJ plug-ins to extend the ImageJ functionality. Documentation for the 1394 Camera Java packages is provided and allows for full control/access of the Scion FireWire 1394 cameras.
- Java Classes were designed to be independent of the ImageJ classes - allowing them to be used as a JDK for developing other Java applications requiring Scion FireWire 1394 Camera access.

## System Requirements

To use the program, you need:

- For Mac OS X 10.4 or higher a G4 or better computer
- Scion Monochrome or Color Firewire camera
- 512 or more Mb minimum recommended
- SVGA TrueColor with 2 Mb or more of Video RAM recommended
- FireWire or IEEE-1394 port

## 1394 Camera Java Package Installation

Installing the program should only take a few minutes. Please follow the steps below:

1. Insert the “Scion Camera Software CD” into the CD-ROM or DVD drive.
2. A window containing the contents of the CD will appear. If it does not then double-click the “Scion CD” icon located on the Desktop.
3. Double-click the “ImageJ” folder.
4. Double-click the “SWFImageJ.sit.gz” file.
5. It will expand into a folder on the desktop called “ImageJ”.
6. Double-click the “ImageJ” folder and Double-click the “ImageJ” icon located in the folder to launch the program.
7. Once ImageJ is running go to the Plug-ins menu and select “Live” from the “1394 Camera” submenu.

## Notes for Existing Users of ImageJ

If a version of ImageJ already exists on this machine then one of two things can be done. If this version does not have any extra plugins or modifications then uninstall

this version and use the Scion Java Package version. If the existing version of ImageJ has many modifications and plugins have been added then the following steps can be used to add the Scion Java Package. First install the Scion Java Package into a different folder than the existing version of ImageJ.

The following files must be copied from the Scion 1394 Camera Java Package install to the folder of the existing version of ImageJ:

#### Plugins Folder

- capture\_image\_.java
- capture\_10\_bit\_image\_.java
- capture\_12\_bit\_image\_.java
- make\_movie\_.java
- live\_.java
- Entire 1394 Camera folder

#### ImageJ Folder

- SFW ReadME.rtf
- ImageJ1394Mac.pdf
- sfwcam.jar
- sfwlive
- libjsfwlib.jnilib
- libjsfwlive.jnilib
- Entire sfwcam folder

#### Package Contents of ImageJ

(To open the Package Contents: Highlight the ImageJ.app. Hold down the Control Key and select Show Package Contents)

Contents\Resources\Java\sfwcam.jar

The last item that needs to be done is that the Info.plist needs to be modified. It is located in the Package Contents of ImageJ in Contents. You can modify it with the Property List Editor. If you do not have this installed then you can go to <http://www.apple.com> and do a search for Property List Editor.

Once in the Property List Editor you click the arrow next to Root. Then click the arrow next to Java. Double-click the Class Path entry. It should read something like:

\$JAVAROOT/ij.jar:/System/Library/Java/Extensions/QT/Java.zip

Add the sfwcam.jar entry to the end of this line so that it reads:

\$JAVAROOT/ij.jar:/System/Library/Java/Extensions/QT/Java.zip:\$JAVAROOT/sfwcam.jar

## Plug-ins

### Capture 10 bit Image

This plug-in will attempt to capture a 10-bit Monochrome or 30-bit Color image.

### Capture 12 bit image

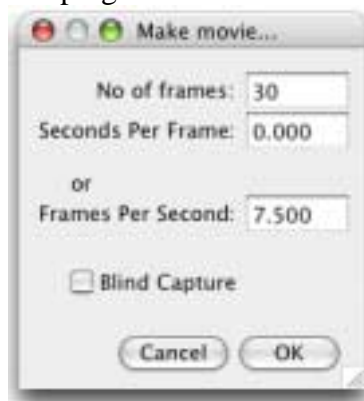
This plug-in will attempt to capture a 12-bit Monochrome or 36-bit Color image.  
Requires a Scion 12-bit camera to function.

### Capture Image

This plug-in will capture an 8-bit Monochrome or 24-bit Color image.

### Make Movie

This will start the Make Movie plug-in.



**No. of frames:**

Sets the number of frames to capture in the movie or sequence.

**Seconds Per Frame:**

This will set the time in seconds between each frame. This is 0 by default. The plug-in will use Seconds Per Frame first unless the value is 0.

**Frame Per Second:**

This will set the frames per second. This number will only be used if the Seconds Per Frame is set to zero.

**Blind:**

Checking this box will enable blind capturing. The resultant stack will not be displayed until the entire sequence is captured. This may help to increase frame rates.

### Live

This will start the Live Capture plugin. See next section for a full explanation of each function in the Live Capture plugin.

# Live Plugin

## File Menu

### Acquire Full Image

This will acquire the full captured image and send it back to the ImageJ program.

### Acquire Selected Image

This menu item will acquire the selection that is contained in the capture window and send it back to the ImageJ program.

### Quit Live Interface

Exits the Live plugin program.

## Image Menu

### Start Live Capturing

This will start live video using the selected Scion FireWire Camera, you can also use the hotkey Command + G to start capturing. Notice how, during continuous capture, the name of this command changes to “Stop Live Capture” and “Live” appears in the title bar. To capture the image, select “Stop Live Video” or click anywhere on the image. Once captured the title bar changes so that “Captured” is displayed. Once capturing is stopped a rectangular selection can be made. While capturing, you are allowed to change various settings in the Properties window. See below for more information about Properties.

### Snap

This command will quickly capture a single frame based on the current Properties settings, excluding the Multi-Frame settings. Once captured, the title bar changes so that “Processed” is displayed. Using the Snap is highly recommended when the Exposure is set high. See below for more information about Properties.

### Multi-Frame Process

Selecting this will capture a frame based on the current multi-frame settings in the Properties window. During the capturing the Title Bar will change to “Processing” to show that the Multi-Frame capture is being processed. Once captured, the title bar changes so that “Processed” is displayed, at this time the image can be saved. At any

time during the multi-frame process the Escape key can be used to abort the processing. See below for more information about Properties and Multi-Frames.

## Show Properties...

Selecting this menu item will allow you to configure the currently selected Scion FireWire Camera.

### Settings

This tab shows the camera settings that are currently being used.



### Gain

Allows the setting of the Gain on the camera. This will help to adjust the contrast of the image. Changes are interactively displayed if the camera is in live capturing mode. The Gain level for Color cameras can be set in the range of  $-12.40$  dB to  $23.81$  dB. The Gain level for the Monochrome camera can be set in the range of  $-7.9$  dB to  $28.31$  dB.

**Auto** - Clicking the Auto button will allow the program to attempt to automatically adjust the Exposure to the most desirable level. An error could occur if the image is too dark or too saturated.

### Contrast

This will allow setting a variable Contrast in the live image. Contrast changes the difference between the light and dark tones. It is a relative scale from  $-127$  to  $128$  where  $0$  is no contrast changes.

### Black

This setting lets the user change the Black Level setting. Sets the level of brightness at the darkest (black) part of the image. It can be in the range of  $0$  V to  $.062$  V.

**Exposure**

This allows the Exposure setting to be set to the number of frames specified. This is useful with low light subjects such as Gel Analysis and Fluorescence. The range can be from .010 seconds to 100 seconds. When setting Exposure to a high number, make sure that capturing is stopped and the Snap is used. When the capturing is live and the Exposure is set high then stopping the capture will require another cycle of exposure.

**Auto** - Clicking the Auto button will allow the program to attempt to automatically adjust the Exposure to the most desirable level. The Gain will also be adjusted if it is set too low for the Auto Exposure to complete. In this instance the Gain will be set to the lowest value where there is a sufficient number of white pixels. An error could still occur if the image is too dark or too saturated.

**Live Rate**

Allows for the setting of the live readout speed of the camera. This setting will only affect the speed at which the live image is streamed to the screen. Most users will want to set this to the fastest rate possible. Depending on the camera installed the settings can be 28 MHz, 14MHz and 7 MHz.

**Capture Rate**

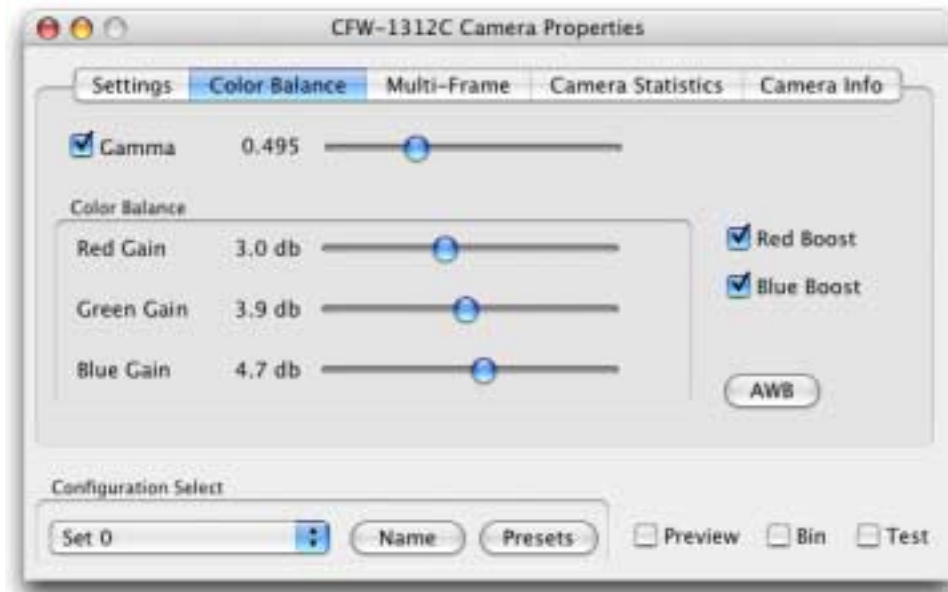
This will set the readout speed of the captured image. Most users will want to set this to a low to middle speed. Higher quality images can be captured at lower readout speeds. But if using long Exposure or long Multi-Frame captures the image will take longer to capture at lower readout speeds. Depending on the camera installed the settings can be 28 MHz, 14MHz and 7 MHz.

**Image Depth**

This setting is for changing the depth of the image. This can be set to 8 bits, 10 bits or 12-bits depending on which Scion camera is installed.

**Color Balance**

This tab is only available if a color Scion FireWire camera is connected and selected. It will allow for manual and automatic color balance options.



### **Gamma**

With this enabled the video signal will be compensated to produce natural-tone images. The scale ranges from .200 to 4.755 where 1 is no Gamma correction. When disabled the video signal has no compensation and is output linearly.

### **Red Gain**

Adjustment for the red gain in the camera. Helps to adjust the Red contrast of the image. The Red Gain range is  $-2$  dB to 10.2 dB.

### **Green Gain**

Adjustment for the green gain in the camera. Helps to adjust the Green contrast of the image. The Green Gain range is  $-2$  dB to 10.2 dB.

### **Blue Gain**

Adjustment for the blue gain in the camera. Helps to adjust the Blue contrast of the image. The Blue Gain range is  $-2$  dB to 10.2 dB.

### **Red Boost**

Digital calculation to increase the Red Gain. Used in specific imaging circumstances.

### **Blue Boost**

Digital calculation to increase the Blue Gain. Used in specific imaging circumstances.

### **Gamma**

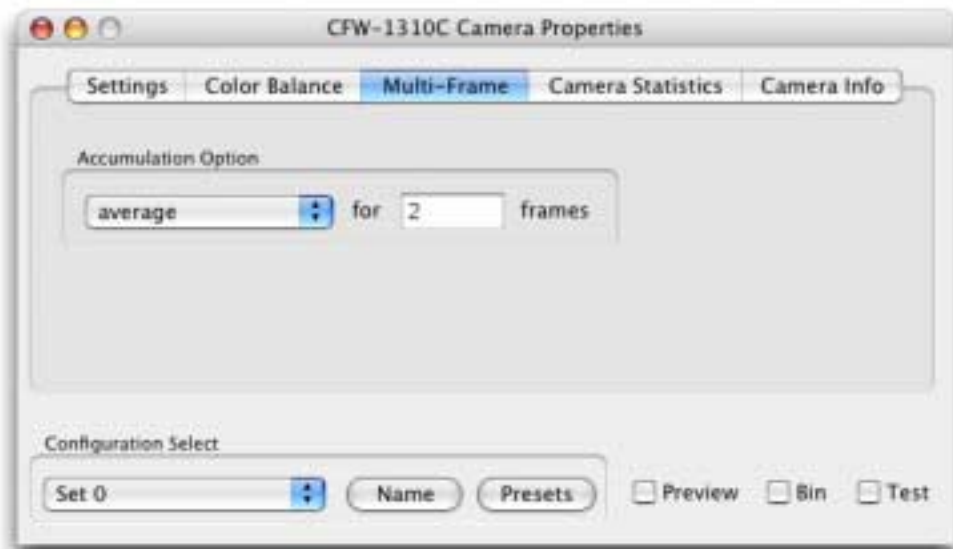
With this enabled the video signal will be compensated to produce natural-tone images. When disabled the video signal has no compensation and is output linearly.

## AWB

This option will Auto White Balance (AWB) the image. The best method is by using a selection in an area that is supposed to be a shade of light gray and clicking the AWB button. Sometimes having the Red Boost and Blue Boost enabled will give better results. The Auto White Balance may take a few moments to complete, this is normal. A failure of Auto White Balance may occur if the image is too dark or too saturated, adjustment of Gain or Exposure may be necessary.

## Multi-Frame

The settings in this tab will allow the user to do frame averaging or summation.



### Accumulation Option

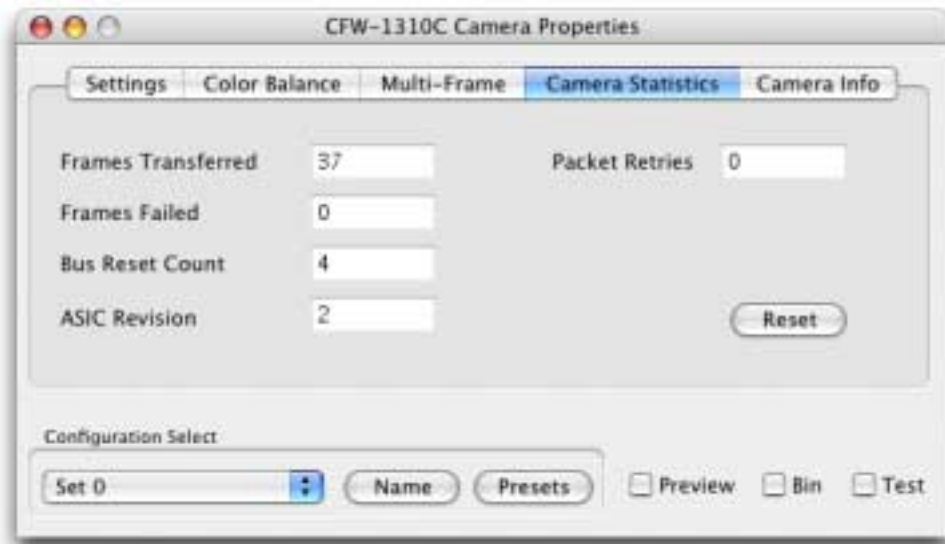
This sets the accumulation option to, no accumulation, average or sum. *No accumulation* will set the Multi-Frame option to no accumulate. So when the Multi-Frames is selected from the Image menu, only a single frame will be captured. *Average* will average the selected number of frames. This is sometimes useful in reducing random noise in the image. *Sum* will do a frame summation for the selected number of frames. This is used to make the resultant image brighter.

### Frames

Selects the number of frames to accumulate. Can be in a range from 2 to 65535.

### Camera Statistics

This gives the statistics of the camera and the connection to the IEEE 1394 (FireWire) bus. Generally this information would be used for troubleshooting or technical support purposes.

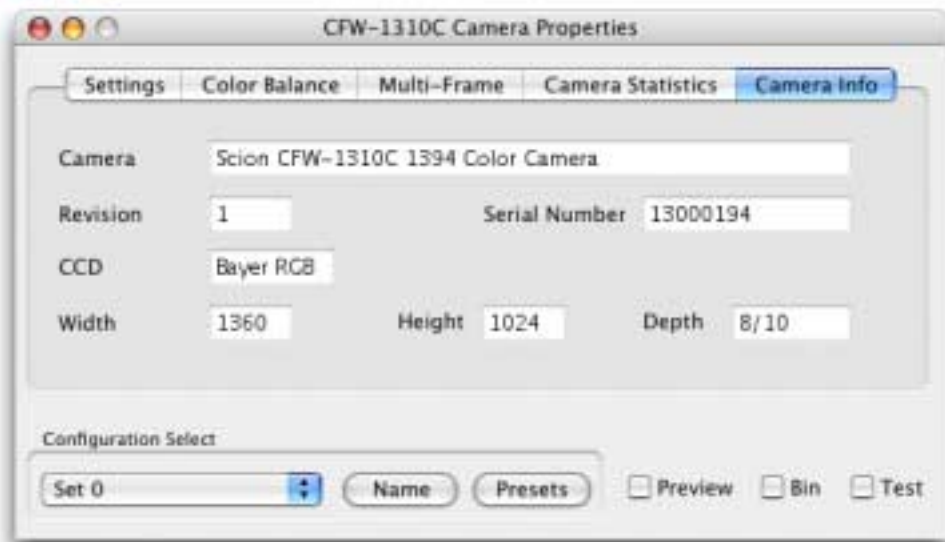


### **Reset**

Clicking this button will reset all of the statistics back to their default starting point.

### **Camera Info**

This gives general information on the currently selected camera.



### **Camera**

Shows the model camera that is currently selected.

### **Revision**

Shows the internal revision number of the camera.

### **Serial Number**

Shows the internal Serial Number of the camera.

**CCD**

Shows the type of CCD installed in the currently selected camera.

**Width**

Width of the CCD chip installed in the camera.

**Height**

Height of the CCD chip installed in the camera.

**Depth**

Shows the pixel depth of the camera.

**Configuration Select**

Ten sets of Properties settings for the camera can be created and saved. A selection can be made to the configuration selection, which is most suitable for the shooting condition at hand. The currently active configuration selection is shown in the Properties window. All settings are saved upon exit of the program.

**Name**

This will bring up a window to allow the user to create a custom name for the currently selected configuration.

**Presets**

This will set all camera settings and functions to their factory default.

**Preview**

This check box will enable preview mode. This will increase the capture rates to aid in positioning and focusing of the camera. Images cannot be saved or captured from the Preview Window. While in Preview mode the image cannot be set to Bin mode.

**Bin**

Checking this box will enable the Binning mode. Binning creates each pixel in the image by summing four adjacent pixels. All of the property settings can be adjusted in this mode with the exception of Preview. A capture in Bin mode cannot be set into Preview mode.

**Test Pattern**

Check this box to test the camera. Usually this will only be used by technical support if there is a problem with the camera.

## **Help Menu**

### **Scion On The Web**

This section of the help menu will send you to various parts of the Scion Corporation website.

### **About Scion 1394 Java...**

This will bring up a window with information about the plugin.

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