

## **Scion FG Java Package For ImageJ Mac OS X Version**

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## Table of Contents

<b>GETTING STARTED .....</b>	<b>5</b>
<i>Introduction.....</i>	5
<i>Features .....</i>	5
<i>System Requirements .....</i>	5
<i>Installation.....</i>	5
<i>Notes for Existing Users of ImageJ .....</i>	6
<b>USING THE SCION FG JAVA PACKAGE.....</b>	<b>8</b>
<i>Start Using .....</i>	8
<i>Plugins .....</i>	8
Capture Grayscale.....	8
Capture Grayscale HR.....	8
Capture RGB.....	9
Capture RGB HR .....	9
Live .....	9
Live Capture.....	9
Make FG Movie.....	9
Video Print.....	9
<i>Multiple Frame Grabber Boards .....</i>	9
<b>SCION FG JAVA LIVE.....</b>	<b>11</b>
FILE MENU .....	11
<i>Acquire Full Image .....</i>	11
<i>Acquire Selected Image.....</i>	11
<i>Quit Live Interface .....</i>	11
IMAGE MENU .....	12
<i>Start Live Capturing .....</i>	12
<i>Snap.....</i>	12
<i>Multi-Frame Process .....</i>	12
<i>Show Properties... .....</i>	12
Settings.....	12
Camera .....	13
Image.....	13
Video Format .....	13
Starting Field.....	13
Invert .....	13
Video Pass Through.....	13
External Trigger .....	13
Color Balance.....	13
Brightness .....	14
Contrast.....	14
Reset.....	14

Multi-Frame .....	14
Accumulation Option.....	14
Integration Option.....	14
Frame Grabber Info.....	15
Frame Grabber .....	15
Revision .....	15
Grayscale Frame Buffers.....	15
Video Format .....	15
RGB Frame Buffers .....	15
Configuration Select .....	15
Name .....	16
Presets .....	16
<b>SCION LIVE CAPTURE.....</b>	<b>17</b>
<i>Tool Bar</i> .....	17
<i>Status Bar</i> .....	17
FILE MENU .....	19
<i>Export Image</i> .....	19
<i>Store Preferences</i> .....	19
<i>Quit</i> .....	19
IMAGE MENU .....	20
<i>Start (Stop) Live Video</i> .....	20
<i>Frame Processing</i> .....	20
Accumulation Option:.....	20
Average .....	20
Sum .....	20
No Accumulation .....	20
Integration Option:.....	20
On Chip.....	20
On Trigger.....	21
No Integration .....	21
<i>Video Control</i> .....	21
Camera .....	21
Image.....	21
Starting Field.....	21
Video Format .....	21
Invert .....	21
External Trigger .....	21
Video Pass Through .....	22
<i>Color Balance</i> .....	22
<i>FG Information</i> .....	22
Frame Grabber .....	22
Revision .....	22
Video Format .....	22
RGB Frame Buffers .....	23

Grayscale Frame Buffers.....	23
VIEW MENU .....	24
<i>Zoom In</i> .....	24
<i>Zoom Out</i> .....	24
<i>Tool Bar</i> .....	24
<i>Status Bar</i> .....	24
<b>MAKE FG MOVIE.....</b>	<b>25</b>
<i>No. of frames:</i> .....	25
<i>Seconds Per Frame:</i> .....	25
<i>Frame Per Second:</i> .....	25
<i>Blind:</i> .....	25

# Getting Started

## Introduction

This manual describes the Scion FG Java Package that can be used to import video images into ImageJ. The Scion FG Java Package works in the Macintosh OS X environment. It currently supports the Scion FG-7 PCI Frame Grabber board. This manual describes the installation and use of the Scion FG Java Package.

Please take a few moments to read through this manual before you begin using the Scion FG Java Package as it should answer some questions that you may have. Please contact Scion Corporation should you encounter difficulty at any time, or if you have any questions.

## Features

The program Features include:

- Allows frame capture, providing scientific quality grayscale video images using the Scion FG-7 frame grabber board.
- External trigger support
- Contrast and Brightness controls
- Integrate On-Chip from 2-127 frames

## System Requirements

Scion FG Java Package has the following requirements for Macintosh OS X:

- G3 Macintosh or better
- Mac OS X version 10.2 or higher
- Minimum RAM Recommended: 128MB
- Scion Frame Grabber Board Drivers for Mac OS X

## Installation

This installation installs ImageJ and the Java runtime in addition to the Scion FG Java Package. This installation may overwrite files from a previous version of ImageJ, which did not include the Scion FG Java Package and the user should take steps to save any configuration or modifications that have been made to these directories. An Update version of this same installer will update an existing version of ImageJ. See the Notes for Existing Users of ImageJ section below.

1. Insert the CD labeled “FG-7 CD” into the CDROM drive. If you downloaded the Scion Java Package for Mac OS X then proceed to step number 5.
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. Make sure that the driver is installed before proceeding. See the Software Installation sheet included with the frame grabber. It is also located in the “Install Sheets” folder on the “FG-7 CD”
4. Double-click the “ImageJ” folder.
5. If updating a previous version of ImageJ then double-click the Update folder.
6. Copy the “SFGImageJ.tar.gz” file to the desktop.
7. Double-click the “SFGImageJ.tar.gz” on the desktop.
8. The file expands into the “SFGImageJ.tar” file and the “ImageJ” folder, both located on the desktop.
9. You may delete the “SFGImageJ.tar” and “SFGImageJ.tar.gz” files when the installation is complete.

The Scion FG Java Package requires a Scion PCI Frame Grabber card and Driver Software. If the drivers are not already present, they may be installed from the Scion Application CD included with the Scion Frame Grabber card or they may be installed from Scion's Web Site. If you are having problems accessing the Frame Grabber card - please refer to installation procedures for the specific Frame Grabber.

### **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 any modifications and plugins have been added then the following steps can be used to add the Scion FG Java Package. First install the Scion FG Java Package into a different folder than the existing version of ImageJ.

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

#### Plugins Folder

- Capture\_Grayscale.java
- Capture\_Grayscale\_HR.java
- Capture\_RGB.java
- Capture\_RGB\_HR.java
- Live\_.java
- Live\_Capture.java
- Video\_Print.java
- Make\_FG\_Movie.java
- Entire Scion FG folder

#### ImageJ Folder

- libjscionfg.jnilib
- libsfglive.jnilib

sfglive  
Entire Scion 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\scion.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 scion.jar entry to the end of this line so that it reads:

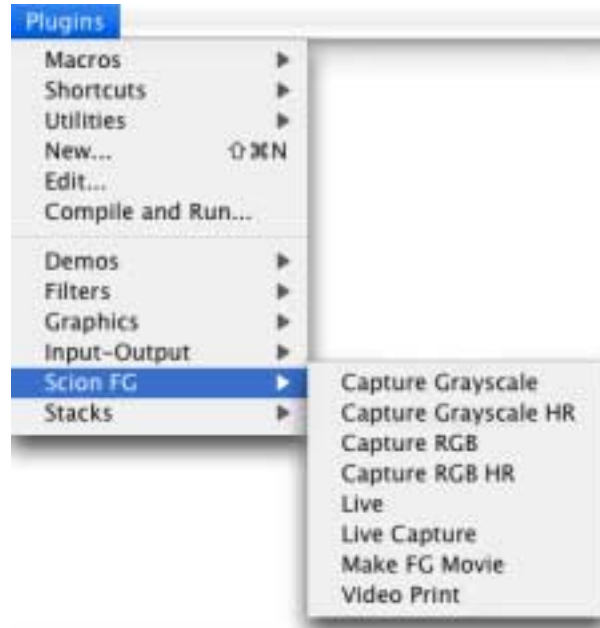
```
$JAVAROOT/ij.jar:/System/Library/Java/Extensions/QT/Java.zip:$JAVAROOT/scion.jar
```

Refer to ImageJ documentation on how to invoke the ImageJ program.

## Using The Scion FG Java Package

### Start Using

Now that installation of the Scion Java Package is complete it is time to start using the Plugins. Open the ImageJ program and go to the Plugins menu, you will see a menu similar to the following:



The Scion FG Java Package comes with pre-made plugins to help with image capture. Source code for the plugins mentioned above are included with the installation. They can be used as samples for developing new plugins or can be modified to suit specific needs.

### Plugins

#### **Capture Grayscale**

This plugin will capture a single grayscale image into ImageJ. It will use the most recently saved settings for capture.

#### **Capture Grayscale HR**

This plugin will capture a single high resolution grayscale image into ImageJ. This requires a frame grabber that supports high resolution mode. Currently only the CG-7 PCI supports high resolution capture. It will use the most recently saved settings for capture.

### **Capture RGB**

Captures a single RGB image into ImageJ. This requires a frame grabber that supports RGB capture. Currently only the CG-7 PCI supports RGB capture.

### **Capture RGB HR**

This plugin will capture a single high resolution RGB image into ImageJ. This requires a frame grabber that supports high resolution mode. Currently only the CG-7 PCI supports high resolution capture. It will use the most recently saved settings for capture.

### **Live**

Selecting this plugin will start the Scion FG Java live capture interface. This interface is to be used with the FG-7 frame grabbers. See the Scion FG Java Live section for a more detailed explanation of the interface.

### **Live Capture**

Choosing this from the menu will bring up the Scion Live Capture interface. This interface is used for legacy boards like the AG-5 PCI, LG-3 PCI, VG-5 PCI and CG-7 PCI. See the Scion Live Capture section which helps to explain the interface in greater detail.

### **Make FG Movie**

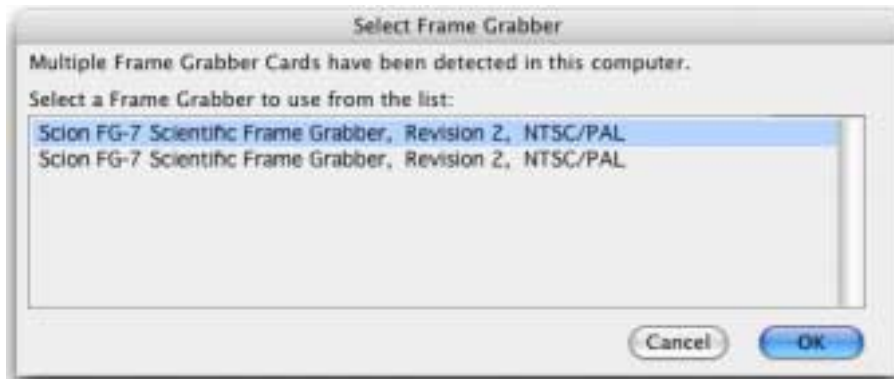
This plugin will allow for the creation of a movie or time lapse video to a stack of frames. It will use the most recently saved settings for capture. See the Make FG Movie section for further details.

### **Video Print**

This will take the currently selected image and put it to the output video buffer of the connected frame grabber board. If the image is smaller than the output video size then it will be centered. If the image is larger than the output video size then it will be clipped. This command is only supported in the FG-7 PCI, VG-5 PCI and CG-7 PCI.

## **Multiple Frame Grabber Boards**

If multiple frame grabber boards are installed, a dialog box like the following will appear:



This will show a list of the currently installed Scion frame grabber boards. It gives the model number, revision number and video type setting.

## Scion FG Java Live

This plugin will be executed when selecting Live from the Plugins menu. The Scion FG Java Live interface is to be used with the Scion FG-7 PCI Frame grabber boards. Some functions may work with the older legacy boards, however if using an older frame grabber board it would be best to use the Scion Live Capture instead.

### File Menu

#### Acquire Full Image

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

#### Acquire Selected Image

This option will only acquire a user selected region and send it back to ImageJ.

#### Quit Live Interface

This menu item will quit the module without acquiring an image.

## Image Menu

### Start Live Capturing

Continuously displays live video using the Scion FG-7 PCI frame grabber board. Notice how, during continuous capture, the name of this command changes to “Stop Capturing” and “Live” appears in the title bar. To “freeze” the image, select “Stop Capturing”, type Command + G, or click in the acquisition window. While capturing, you are allowed to change offset and gain in the “Color Balance” Tab.

### 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. Use this command when the External Trigger is selected. See below for more information about Properties.

### Multi-Frame Process

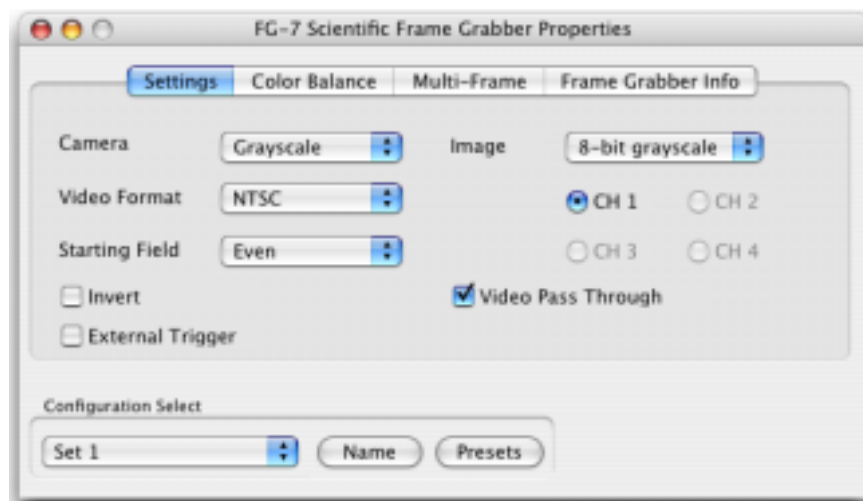
Selecting this will capture a frame based on the current multi-frame settings in the Properties window. During the capturing the Title Bar will change to “Processing” to show that the Multi-Frame capture is being processed. Once captured, the title bar changes so that “Processed” is displayed, at this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

### Settings

This tab shows the frame grabber settings that are currently being used.



**Camera**

This specifies that the frame grabber is connected to a *Grayscale* camera. This setting cannot be changed with the FG-7 installed.

**Image**

Specifies that the image capturing will be done in *Grayscale*. This setting cannot be changed with the FG-7 installed.

**Video Format**

Selects if the video input is *NTSC* (640 x 480) or *PAL* (768 x 576). North America, South America and Japan usually have NTSC video source. While Europe and Asia mainly have PAL video input.

**Starting Field**

This can be *Odd* field first or *Even* field first. The default is *Even* field first.

**Invert**

The video is inverted when this option is selected.

**Video Pass Through**

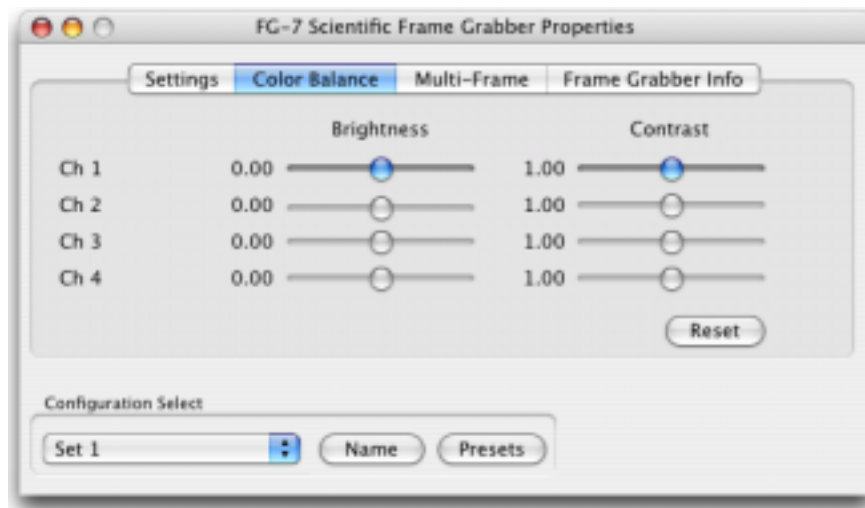
With this selected the video will pass through the frame grabber board to the output line. Even when the live is stopped the video will continue on the output line of the frame grabber board.

**External Trigger**

This can be set to have the frame grabber board will wait for an external trigger pulse before capturing an image.

**Color Balance**

This tab contains the settings for Contrast and Brightness for the frame grabber board.



### **Brightness**

This will for the adjustment of the Brightness for the frame grabber board. Values range from -1 to 1 with 0 as the default.

### **Contrast**

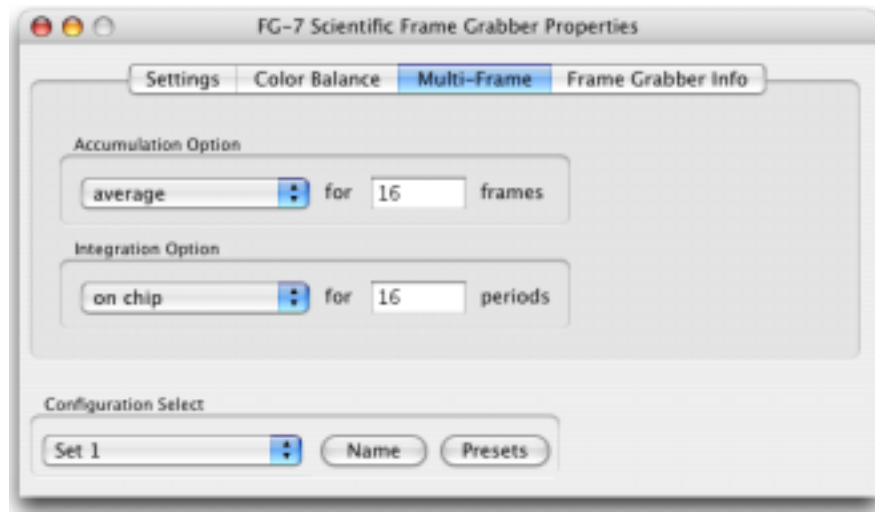
This will allow for the adjustment of the Contrast for the frame grabber board. Values range from .5 to 2.0 with 1 as the default.

### **Reset**

All Brightness and Contrast settings will be set back to their default values if the Reset button is clicked.

### **Multi-Frame**

The settings in this tab will allow the user to do frame averaging, summation, integrate on-chip, or a combination of those functions.



### **Accumulation Option**

**Average** will take the number of frames specified and average them. This is used to reduce random noise in the image. This option can be used in addition to the Integration Options.

**Sum** will add the number of frames specified to get a brighter image. This option can be used with the Integration Options.

**No Accumulation** specifies that no accumulation operations will be done.

### **Integration Option**

**On Chip** will do on chip integration for the number of frame periods specified, using certain models of Cohu series and Dage-MTI cameras, see Scion for details. The purpose is to brighten the image in a low light situation; this is better than summing because the camera is generating the integrated image. The

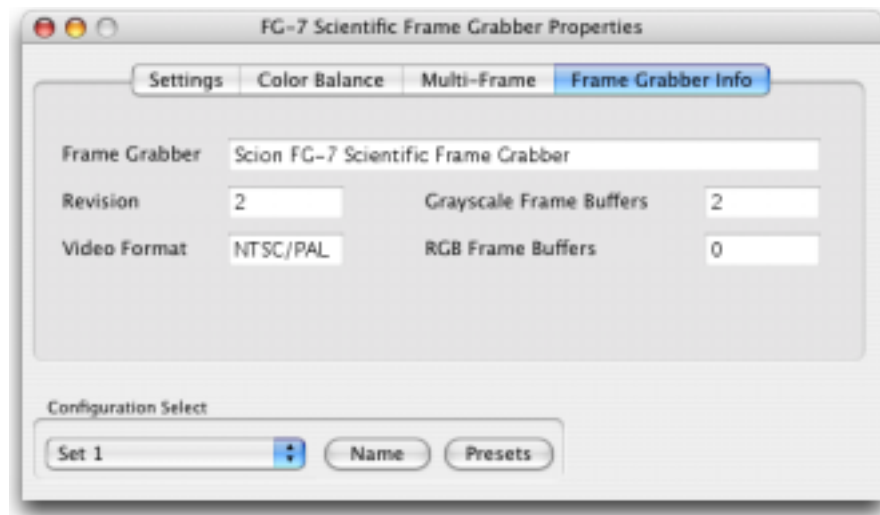
camera will integrate on-chip for the specified number of frame periods and the frame grabber will capture the integrated frame. On-chip integration requires a special cable, available from Scion, for connecting the integration input of the camera to the frame grabber. This can be used in addition to the Averaging Options.

**On Trigger** will wait for an external trigger pulse before capturing the image. This can be used in addition to the Averaging Options.

**No Integration** specifies that no integration operations will be done.

### Frame Grabber Info

This will give general information about the connected frame grabber board.



#### Frame Grabber

This will show the current frame grabber board.

#### Revision

Shows the current revision of the frame grabber.

#### Grayscale Frame Buffers

Number of grayscale frame buffers on the board.

#### Video Format

Shows the video format that is supported with the frame grabber board.

#### RGB Frame Buffers

Number of RGB frame buffers on the board.

### Configuration Select

Ten sets of Properties settings for the frame grabber board 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 frame grabber settings and functions to their factory default.

## Scion Live Capture

This plugin will be executed when selecting Live Capture from the Plugins menu. The Scion Live Capture interface is to be used with the older Scion legacy boards such as the AG-5 PCI, LG-3 PCI, VG-5 PCI and CG-7 PCI. Some functions will not work with the newer FG-7 PCI. Users of the FG-7 PCI should use the Scion FG Java Live instead.

### Tool Bar

The Tool Bar is located immediately below the menu bar and contains buttons that afford easy access to selected commands.



**Stop Live Video:** Use this button to stop live video capturing.



**Start Live Video:** This command is used to start live video capturing.



**Export Image:** This will send the current image to ImageJ for later processing. If there is a live preview then the Plug-In will automatically stop and capture the image.



**Frame Processing:** Accumulation and Integration options can be set here.



**Video Control:** Displays a dialog box that allows for interactively controlling capturing.



**Color Balance:** This will allow adjustment of Brightness and Contrast for each frame grabber channel or the average of all channels.



**Zoom Out:** This will zoom out the live image to make it larger or is also used to zoom back to full size. Captured images will always be full size.



**Zoom In:** This will zoom in the live image to make it smaller. This helps to speed up the capturing process on slower computers. Captured images will always be full size.



**FG Information:** This shows the current frame grabber used and its configuration.



**Scion On The Web:** Clicking this button will open your web browser and attempt to go to the Scion Corporation website.



**About Scion:** This will bring up a window with contact information for Scion Corporation and the Plug-In version number.

### Status Bar

The Status Bar gives information about the live preview.



The left side of the Status Bar gives information about the state of the Plugin. Messages will appear dealing with Capturing, Frame Processing, etc.

The middle section tells the size of the captured image. Standard NTSC is 640 x 480 pixels, while PAL is 768 x 576 pixels.

The right side of the Status Bar gives an indication of the Zoom level. Zoom levels are 1:1, 1:2, 1:4 and 1:8.

## **File Menu**

### **Export Image**

Use “Export Image” to send the image to ImageJ for later analyzing. The “Export Image” button located in the Tool Bar may also be used. If there is a Live Preview then the Plug-in will automatically stop and capture the image.

### **Store Preferences**

The “Store Preferences” command will save all settings in the program. This includes the Video Control, Color Balance, Frame Processing, Zoom, Tool Bar and Status Bar settings.

### **Quit**

Choosing “Quit” will close the Scion Live Capture Plugin and all associated windows.

## Image Menu

### Start (Stop) Live Video

“Start Live Video” continuously displays live video using the selected Scion Frame Grabber board, you can also use the “Start Live Video” button in the Tool Bar. Notice how, during continuous capture, the name of this command changes to “Stop Live Video (capture)” and “Live Video In Progress” appears in the Status Bar. To capture the image, select “Stop Live Video” or click the “Stop Live Video” button on the Tool Bar. While capturing, you are allowed to change Brightness and Contrast.

### Frame Processing...

Averages, sum's or integrates 2 to 127 video frames to reduce time-varying random noise and increase image brightness. Accumulation and integration will be done on the entire image. The “Frame Processing” button on the Tool Bar will also bring up this dialog window. Using “Store Preferences” will save all settings.



#### Accumulation Option:

##### Average

This will average the number of frames specified. It is used to reduce random noise in the image. This option can be used in addition to the Integration Options.

##### Sum

Sum will add the number of frames specified. This is used to make the resultant image brighter. This option can be used in addition to the Integration Options.

##### No Accumulation

This specifies that no accumulation operations will be done.

#### Integration Option:

##### On Chip

This will do on-chip integration for the number of frame periods specified, using certain models of CoHu series or Dage-MTI cameras, see Scion for details. The purpose is to brighten the image in a low light situation; this is better than summing because the camera is generating the integrated image. The camera

will integrate on-chip for the specified number of frame periods and the frame grabber will capture the integrated frame. On-chip integration requires a special cable, available from Scion, for connecting the integration input of the camera to the frame grabber. This can be used in addition to the Averaging Options.

### **On Trigger**

On Trigger will wait for an external trigger pulse before capturing the image. This can be used in addition to the Averaging Options.

### **No Integration**

Specifies that no integration operations will be done.

## **Video Control...**

Displays a dialog box that allows you to interactively control video capturing. This dialog box will also come up if the “Video Control” button is chosen in the Tool Bar. Using “Store Preferences” will save all settings.



### **Camera**

This specifies that the frame grabber is connected to a Grayscale camera.

### **Image**

Specifies that the image capturing will be done in *Grayscale*.

### **Starting Field**

This can be *Odd* field first or *Even* field first. The default is *Even* field first.

### **Video Format**

Video Format allows users select between NTSC or PAL video signals

### **Invert**

This setting will invert the captured and live image.

### **External Trigger**

Allows the Plugin to wait for an external trigger signal to be applied to the frame grabber during the *Stop Live Capture* command. The Plugin will only wait for the trigger signal during the *Stop Live Capture* and *Export Image* commands. Live Capturing will proceed normally.

### Video Pass Through

Enables the real-time display of digitized video on external monitors.

### Color Balance...

This item allows you to adjust the *Brightness* and *Contrast*, for the input channel of the frame grabber card. Changes are interactively displayed in live video mode. The objective when using these controls is to optimize the image brightness and contrast. *Brightness* has values from -1 to 1 with 0 as the default reset value. *Contrast* has values from .5 to 2 with 1 as the default reset value.



Use “Store Preferences” to save these settings. All *Brightness* and *Contrast* settings will be set back to their default if the Reset button is clicked. The “Color Balance” command can also be executed by clicking the “Color Balance” button on the Tool Bar.

### FG Information...

This shows the current frame grabber installed and the configuration. This can also be executed by clicking the “FG Information” button on the Tool Bar.



#### Frame Grabber

Displays the model frame grabber that is being used to capture.

#### Revision

Gives the current revision of the frame grabber board. This is mainly used for Technical Support purposes.

#### Video Format

Tells what video format the frame grabber is configured for.

**RGB Frame Buffers**

Shows the number of RGB frames that the board can hold.

**Grayscale Frame Buffers**

Shows the number of Grayscale frames that the board can hold.

## **View Menu**

### **Zoom In**

This command will zoom in the live image to make it smaller. This helps to speed the capturing process on slower computers. The captured image will always be full size. The “Zoom In” button located on the Tool Bar can also be used to zoom the live image.

### **Zoom Out**

Use this command to zoom out the live image to make it larger or to zoom it back to full size. The captured image will always be full size. The “Zoom Out” button located on the Tool Bar can also be used to zoom out the live image.

### **Tool Bar**

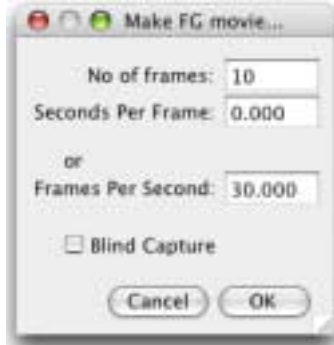
This command toggles the Tool Bar on or off.

### **Status Bar**

This command toggles the Status Bar on or off.

## Make FG Movie

This plugin will be executed when selecting Make FG Movie from the Plugins menu. The Make FG Movie interface is to be used with the Scion FG-7 PCI Frame grabber boards. Some functions may work with the older legacy boards.



### **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 plugin will use Seconds Per Frame first unless the value is 0. If using an FG-7 frame grabber with this set to 0 and Frame Per Second set to 30 then the DMA for the board will be enabled.

### **Frame Per Second:**

This will set the frames per second. This number will only be used if the Seconds Per Frame is set to 0. If using an FG-7 frame grabber with this set to 30 and Seconds Per Frame set to 0 then the DMA for the board will be enabled.

### **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.

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