Scion Corporation

Scion 1394 Camera Driver for Image-Pro

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Getting Started

Introduction

This manual describes the Scion 1394 Camera Driver for Image-Pro. The Camera Driver supports the Scion Monochrome and Color FireWire cameras.

Please take a few moments to read through this manual before you begin using the program, 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 Camera Driver Features include:
- Allows frame capture, providing scientific quality color and grayscale video images using Scion Firewire cameras.
- Allows for setting of Gain and Black level.
- Exposure control from .010 seconds up to 100 seconds.
- Frame rates and image depth can be set via menus.

System Requirements

To use the program, you need:
- A Pentium IV or higher processor for use with Microsoft Windows 2000 or Windows XP
- Scion Monochrome or Color Firewire camera
- Image-Pro version 5.0 or higher
- 256 Mb of RAM (512 or more Mb recommended)
- SVGA TrueColor with 2 Mb or more of Video RAM recommended
- FireWire or IEEE-1394 port

Capture Driver for Image-Pro Installation

Installing the Capture Driver for Image-Pro should only take a few minutes. Please follow the steps below:

1. Insert the "Scion Camera Software" into the CD-ROM or DVD drive.
2. A window containing the contents of the CD will appear. If it does not appear then open Windows Explorer and find the CD.
3. Double-click the "Image-Pro Capture Driver" folder.
4. Double click the "Setup.exe" to install. If you downloaded the 1394 Driver for Image-Pro from our website then double-click the "SFWImagePro.exe" program to start the installation.
5. If running Windows Vista, a User Account control dialog will appear asking for permission to run the installation. If logged in as a Standard User then

enter the administrator password. If logged in as an administrator then click "Allow".
6. Follow the on screen prompts making sure to install to the current Image-Pro folder.
7. In Image-Pro select "Video/Digital Capture" from the "Acquire" menu.
8. Click the "More" button in the dialog and select the "Scion 1394 Camera Driver" from the "Current Driver" box.
9. You can then click the "Preview" button to start capturing.
10. See the documentation that is installed with the program for more information.

Main Dialog

The main dialog is the default dialog in Image-Pro. The main dialog is similar to the image below:
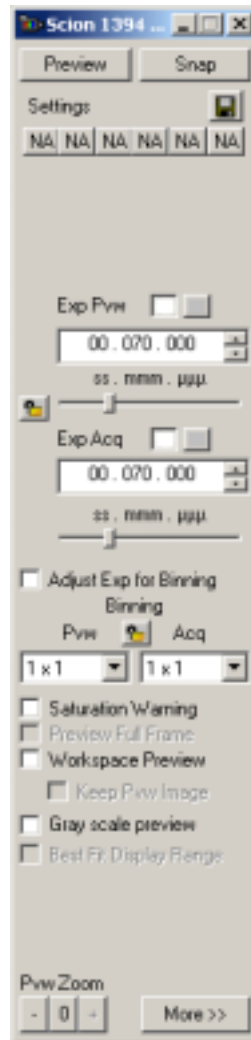
Preview/Stop

Click the Preview button to start the live preview. The button will then change to Stop. Clicking the Stop button will stop the live preview and close the preview window.

Snap

Click this button to initiate the snap. The number of images, destination, and averaging are determined by the settings on the other tabs.

Settings

These buttons are used to load saved settings. Right clicking on the button will give a menu allowing the user to set a new file, review the current settings, un-assign the buttons, save the current settings into a file, or assign a button to that file.

Exp Pvw

The exposure time for the preview image can be set here. The minimum exposure time is 10 milliseconds. The maximum exposure time is 2 minutes. Click the Lock icon to make the exposure times equal for both preview and acquisition.

Exp Acq

The exposure time for the acquisition image can be set here. The minimum exposure time is 10 milliseconds. The maximum exposure time is 2 minutes. Click the Lock icon to make the exposure times equal for both preview and acquisition.

Adjust Exp for Binning

Check this box to automatically adjust the exposure times and the zoom factor to keep the image size and brightness consistent whenever the binning value is changed. Both the preview and the acquire exposure times will be adjusted whenever a binning value or exposure value changes.

Binning

Indicates pixel area for horizontal/vertical pixel accumulation. Both preview and acquisition binning can be specified here. Click the Lock icon to make the Binning equal for both preview and acquisition.

Saturation Warning

Use this option to visualize saturated regions in the captured image. Saturated regions are pixels that are pure white. When this option is selected, all pure white pixels are displayed in red and all pure black pixels are displayed in blue.

Workspace Preview

This enables the preview to be integrated with the Image-Pro workspace.

Keep Pvw Image

Check this box to capture the last image displayed in the workspace window.   If this option is unchecked, no image will be retained.

Gray scale preview

This checkbox will only be available if using a color camera. Checking this will show the preview in grayscale only.

Pvw Zoom

These three buttons allow for the zooming of the live preview window.

More > >

Clicking this button opens an expanded display of the main dialog.

Expanded Dialog

The expanded dialog is a more advanced version of the basic dialog. Many more settings and controls can be set here. The expanded dialog looks similar to below:
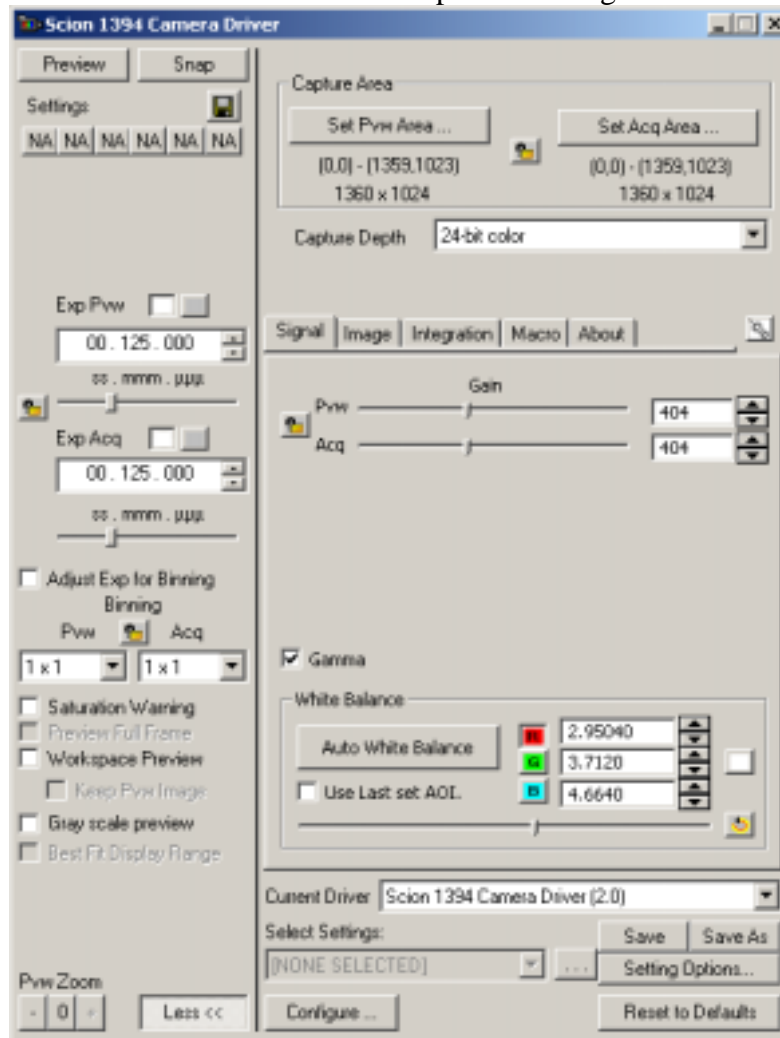
Capture Area

This will allow a specific AOI to be used for the preview and capture. Click the Lock icon to force the preview and acquisition areas to be the same.

Set Pvw Area…
Clicking this button will bring up a dialog box like the following:

There are several ways to select the Preview Area. An AOI can be selected by entering the Left, Top, Right and Bottom pixel coordin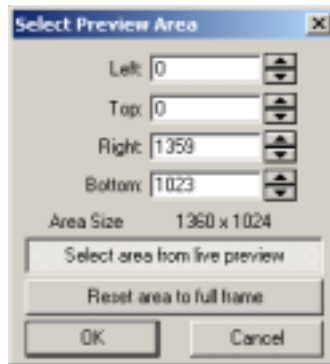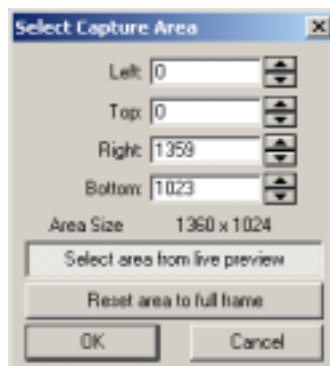ates. The Select Area From Live Preview will allow the user to select an AOI from the Live Preview window. The Select Area From Current Image will allow for a selection to be made from a captured image. Resetting the area to full frame will remove any AOI and defaults back to the full camera area.

Set Acq Area…
Clicking this button will bring up a dialog box like the following:

There are several ways to select the Capture Area. An AOI can be selected by entering the Left, Top, Right and Bottom pixel coordinates. The Select Area From Live Preview will allow the user to select an AOI from the Live Preview window. The Select Area From Current Image will allow for a selection to be made from a captured image. Resetting the area to full frame will remove any AOI and defaults back to the full camera area.

Capture Depth

Select the color or monochrome acquisition depth from the drop down list box.

Capture Tab Pages

These series of tabs will allow for modifying the camera settings, image settings and macro settings. See the Capture Tab section of this manual for further details.

Current Driver

Select the Scion 1394 Camera Driver from the drop-down list to enable the currently connected Scion 1394 Camera. If you have multiple Scion 1394 Cameras connected then you will see a dialog box similar to the one below:
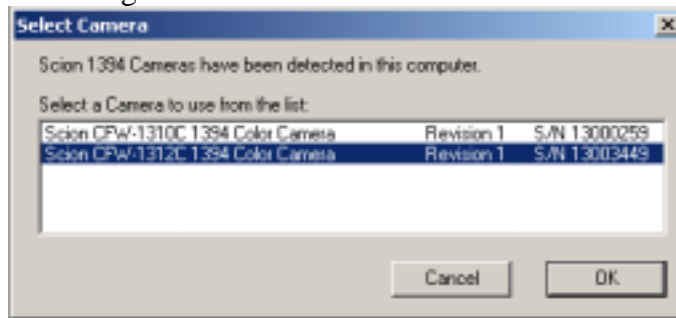
This will show a list of the currently connected Scion 1394 Cameras.   It gives the model number, revision number and serial number of each camera. Select the camera that is needed and click the OK button to proceed.

Select Settings

This drop down box contains a list of user created settings. Settings can be saved and loaded here.

Configure…

Clicking this button will open the configuration for the Scion 1394 camera. The dialog will look similar to below:
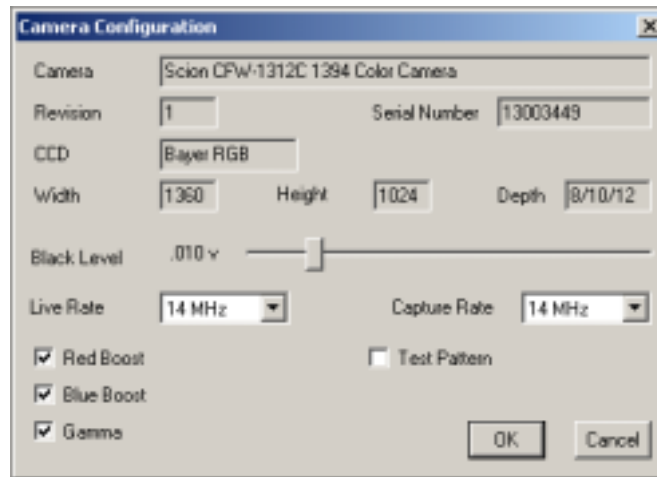
Camera
Shows the model camera that is currently selected.

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.

Black Level
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.

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.

Red Boost
Digital calculation to increase the Red Gain. This will slightly boost the red signal which can be useful for color correction or white balancing. This option is only available when a color camera is connected.

Blue Boost
Digital calculation to increase the Blue Gain. This will slightly boost the blue signal which can be useful for color correction or white balancing. This option is only available when a color camera is connected.

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. This option is only available when a color camera is connected.

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.

Reset To Defaults
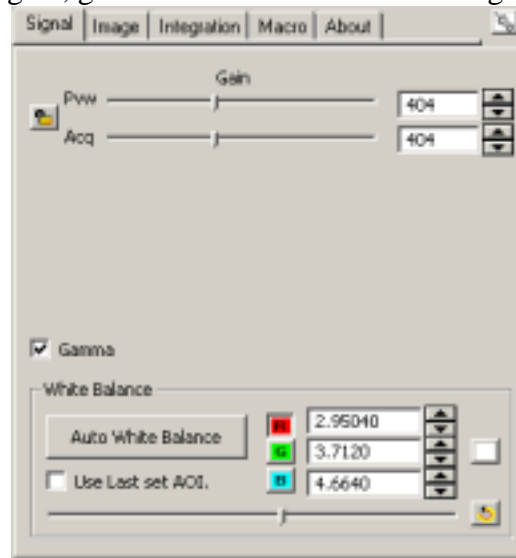
Clicking this button will set all settings back to their defaults.

Capture Tabs

This section will describe the assorted capture tabs that are associated with the CFW series of FireWire cameras for use in the ImagePro software program.

Signal Tab

This tab will allow for gain, gamma and white balance settings.

Gain
These sliders control the gain for both preview and acquisition. Preview and acquire may be adjusted individually or they may be locked together to set both simultaneously. Click the Lock icon to make the gain settings equal for both preview and acquisition.

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.

White Balance
These controls will allow for the adjustment of the white balance manually or automatically.

R
Select this button and either move the slider or click the arrow buttons to adjust the Red Gain. Click the white box to lock and adjust concurrently the three color channels. Click one of the three color buttons to disable this mode.

G

Select this button and either move the slider or click the arrow buttons to adjust the Green Gain. Click the white box to lock and adjust concurrently the three color channels. Click one of the three color buttons to disable this mode.

B

Select this button and either move the slider or click the arrow buttons to adjust the Blue Gain. Click the white box to lock and adjust concurrently the three color channels. Click one of the three color buttons to disable this mode.
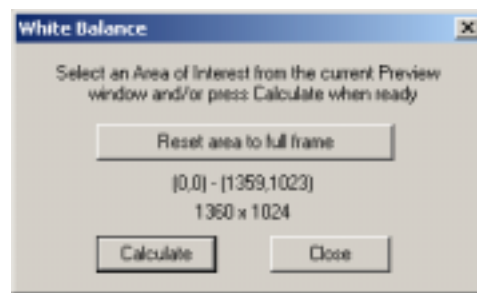
Auto White Balance

Clicking this button will start a live preview, if one is not already started, and start the white balance process. A window will appear similar to the following:

An area can then be selected in the preview window or the area can be reset to use the full frame for the white balance. Click the calculate button to compute the white balance.

Use Last Set AOI

Checking this box will enable the white balance routine to use the most recently set AOI.

Image Tab

This tab contains the controls that determine how the image is captured, and where the images are stored.
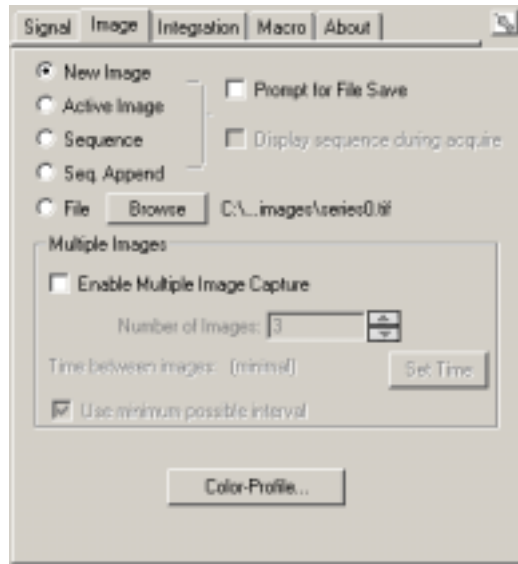
New Image
This option will create a new image when the Snap button is clicked.

Active Image
This option will replace the current image when the Snap button is clicked.

Sequence
Click this option to store images in a sequence file such as a movie sequence.

Seq. Append
This option will allow the capture of a sequence file to be appended to an existing sequence.

File
With this option selected the image that is snapped will be written directly to a file.

Browse
Clicking this button will bring up a dialog where the destination of the saved files can be set.

Prompt for File Save
Once this box is checked the program will prompt for the location to save the snapped image.

Display sequence during acquire
Checking this box will display each frame of a sequence as it is being captured, rather than capturing all the frames before displaying them. This option will slow the sequence capture down, as each frame is displayed before the next one is captured.

Multiple Images
This group contains controls for acquiring several images at once.

Enable Multiple Image Capture
Check this box to turn on multiple image capture. Unchecking this box will turn off multiple image capture, and only single images will be captured.

Number of Images
Enter the total number of images that are to be captured during the timed-acquired session.

Time Between Images
Specify the interval, in Hours, Minutes, Seconds, and Milliseconds, at which the images are to be collected.

Set Time
Clicking this button displays the Time Interval dialog box, where the interval can be specified.

Use Minimum Possible Interval
Check this box to minimize, as much as possible, the time between images.

Integration Tab

The integration tab can be used for averaging and summing. Averaging is used to reduce noise in the image. Summing can be used to enhance the brightness of the image, usually in a low light environment. The Integration page will look similar to the following:
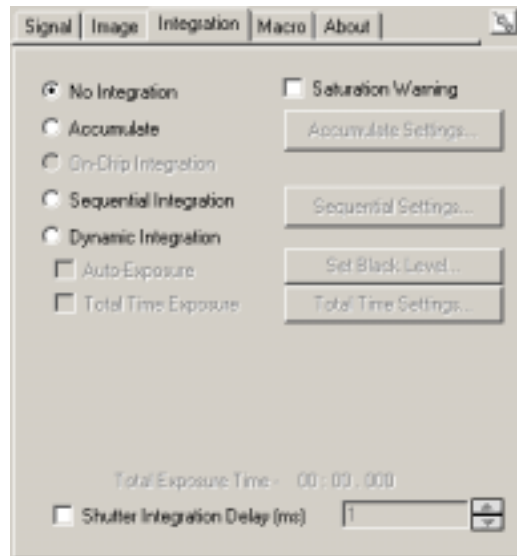
No Integration
This will disable all integration. This should be selected if no integration is required.

Saturation Warning
Use this option to visualize saturated regions in captured image. Saturated regions are pixels that are pure white. When this option is selected, all pure white pixels are displayed in red and all pure black pixels are displayed in blue.

Accumulate

This selection will allow average accumulation or summed accumulation.

Accumulate Settings…

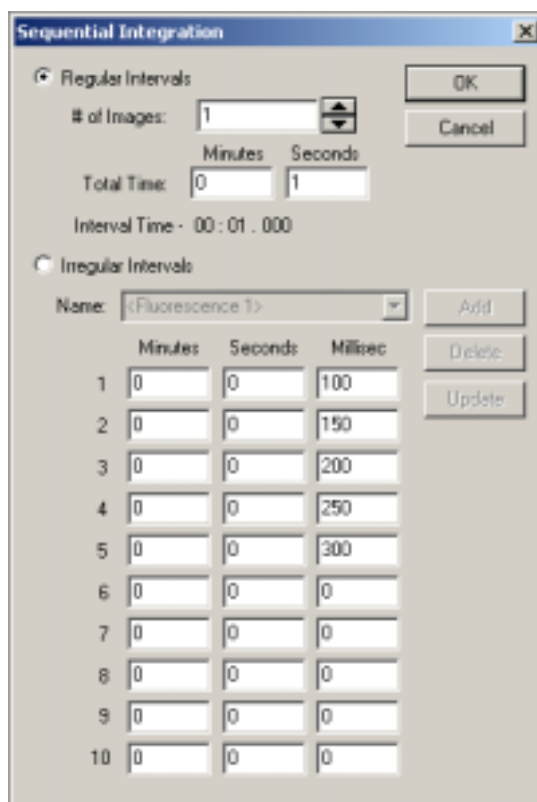Clicking this button will bring up the following dialog box.
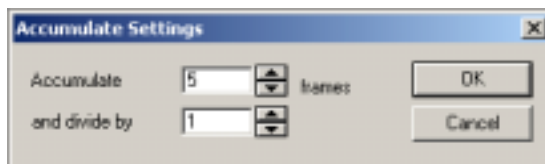
Set the number of accumulated frames and the division factor.

Sequential Integration

Select this option to capture a sequence of integrations where each image represents a different exposure time.

Sequential Settings…

Clicking this button will bring up a dialog box similar to the following:

Regular Intervals

Select this option to capture a series of images with exposure times that increase regularly. The total number of images and the total time must be entered. The program will calculate the Interval Time.

Irregular Intervals
Select this option to capture a series of images with exposure times that are not regular. Intervals must be defined for each image in the sequence.

Dynamic Integration
This option allows you to create an integrated image that represents the accumulation of a series of image captures.

Auto-Exposure
Check this box to do the integration and want it to stop accumulating images when 1% of the image has reached saturation.

Total Time Exposure
Check this to specify the integration to occur for a set number of frames and a set amount of time.

Total Time Settings…
Click this button to set the number of frames and the amount of time for the exposure.

Black Level…
Click this button to specify the pixel value of the darkest gray level. Pixel values in the image less than the value specified here will not be accumulated.

Macro Tab

This tab allows the user to setup macros to be run at specific times before and during the capture and preview process.
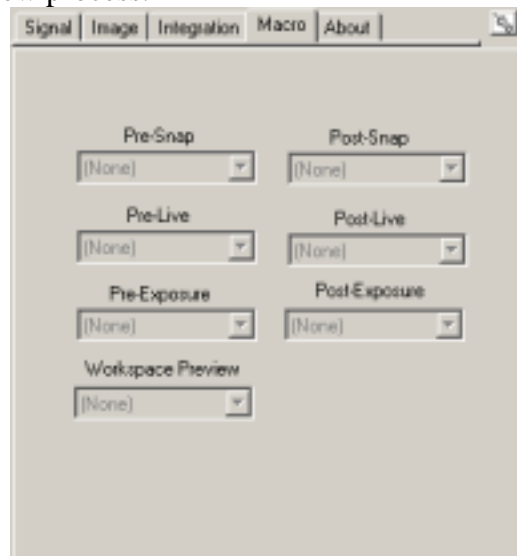
About Tab

The about tab give specific information about the installed capture drivers. It gives information such as the file name, date and version information.
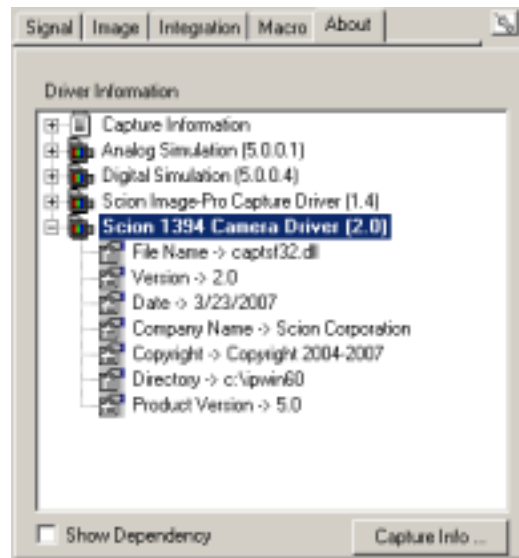
Macro Help

This section of the manual is a description of the various macro commands in Image-Pro that will help to control the Scion Firewire cameras.

Capture Area

ret=IpAcqControl(48, Param, IpParam)

This will set the preview and acquire capture areas. Where the Param is an integer whose values can be 0 for preview area and 1 for acquire area, the IpParam is an integer array for the coordinates of the area (top, left, bottom, right).
Ex:

    Dim captarea(4) as integer
    captarea(0) = 10
    captarea(1) = 20
    captarea(2) = 300
    captarea(3) = 400
    ret=IpAcqcontrol(48, 1, captarea(0))

Exposure Time

ret=IpAcqControl(84, Param, IpParam)

This command will set the preview and acquire exposure times in milliseconds. Where the Param is an integer whose values can be 0 for preview exposure and 1 for acquire exposure, the IpParam is a double in milliseconds.
Ex:

    Dim exposure as double
    exposure = 42.000
    ret=IpAcqControl(84, 1, exposure)

Binning

ret=IpAcqControl(52, Param, IpParam)

Horizontal and vertical binning for preview and acquire is set with this command. Where the Param is an integer whose values can be 0 for preview binning and 1 for acquire binning, the IpParam is an integer array containing the x and y binning.
Ex:

    Dim binning(2) as integer
    binning(0) = 2
    binning(1) = 2
    ret=IpAcqControl(52, 1, binning(0))

Gain

ret=IpAcqControl(53, Param, IpParam)

The gain for preview and acquire is set with this command. Where the Param is an integer whose values can be 0 for preview gain and 1 for the acquire gain, the IpParam is an integer from 0 to 1023.
Ex:
    Dim gain as integer
    gain = 300
    ret=IpAcqcontrol(53, 0, gain)

Bit Depth

ret=IpAcqControl(93, Param, IPNULL)

This command will set the bit depth of the current camera. Where the Param is an integer containing the bit depth.
Ex:
    Dim bitdepth as integer
    bitdepth = 12
    IpAcqControl(93, bitdepth, IPNULL)

Black Level

ret=IpAcqControl(1101, Param, IPNULL)

This command will set the black level of the camera. Where Param is an integer from 0 to 255 with a default value of 39. The corresponding level in volts can be computed as follows: $V = black\_level * .000244$
Ex:
    Dim blacklevel as integer
    blacklevel = 125
    ret=IpAcqControl(1101, blacklevel, IPNULL)

Readout Speed

ret=IpAcqControl(1102, Param, IPNULL)

The capture readout speed of the camera can be set with this command. Where Param is an integer whose value can be 0 for 14 MHz (7.5 fps), 1 for 7 Mhz (3.75 fps) and 4 for 28 MHz (15 fps).
Ex:
    Dim readout as integer
    readout = 1
    ret=IpAcqControl(1102, readout, IPNULL)

Test Pattern

ret=IpAcqControl(1103, Param, IPNULL)

The cameras internal test pattern can be enabled with this command. Where Param is an integer whose value can be 0 to disable the test pattern or 1 to enable the test pattern.
Ex:
    Dim testpattern as integer
    testpattern = 1
    ret=IpAcqControl(1103, testpattern, IPNULL)

Red Boost

ret=IpAcqControl(1104, Param, IPNULL)

This command will set the red boost. Where Param is an integer whose value can be 0 to disable the red boost or 1 to enable the red boost.
Ex:
    Dim redboost as integer
    redboost = 1
    ret=IpAcqControl(1104, redboost, IPNULL)

Blue Boost

ret=IpAcqControl(1105, Param, IPNULL)

This command will set the blue boost. Where Param is an integer whose value can be 0 to disable the blue boost or 1 to enable the blue boost.
Ex:
    Dim blueboost as integer
    blueboost = 1
    ret=IpAcqcontrol(1105, blueboost, IPNULL)

Gamma

ret=IpAcqcontrol(1106, Param, IPNULL)

The gamma control can be toggled with this command. Where Param is an integer whose value can be 0 to disable the gamma or 1 to enable the gamma.
Ex:
    Dim gammaset as integer
    gammaset = 1
    ret=IpAcqControl(1106, gammaset, IPNULL)

Live Readout Speed

ret=IpAcqControl(1107, Param, IPNULL)

The live readout speed of the camera can be set with this command. Where Param is an integer whose value can be 0 for 14 MHz (7.5 fps), 1 for 7 Mhz (3.75 fps) and 4 for 28 MHz (15 fps).
Ex:
    Dim readout as integer
    readout = 1
ret=IpAcqControl(1107, readout, IPNULL)