OWL 320 HS VIS-SWIR

Model: OW1.7-VS-CL-S

USER MANUAL

Raptor
p h o t o n i c s

CONTENT

1.   INTRODUCTION

1.1   Scope

This manual covers the Owl 320 High Speed digital camera and all applicable components. Raptor recommends that this manual be used to optimize camera operation.

1.2   Camera Care

Raptor cameras require no regular maintenance except occasional external cleaning of the sensor window (the glass window between the camera sensor and the microscope or lens). Should any other issues occur please contact your local agent.

To clean the sensor window: gently wipe the face of the sensor window with a small amount of optical grade isopropyl alcohol and lens paper. Apply forced air again to remove any loose particles.

CAUTION — The camera's sensor, and circuits are sensitive to static discharge. Ensure you are using a static strap or are completely grounded at all times to release any static energy before you clean the window.

CAUTION — Do not use acetone.

2. SPECIFICATION

2.1 Camera Specification

The Owl 320 High Speed digital camera is designed for high-resolution applications requiring visible to SWIR imaging (400-1700nm). The Owl 320 High Speed camera uses an InGaAS sensor with a resolution of 320 x 256 in a 14-bit digital output. High-speed low-noise electronics provide linear response and sensitivity for rapid image capture.

The Camera Link digital interface provides the most stable platform for data transfer and the camera will work on any Camera Link standard card.

A Software Development Kit (SDK) is available for interfacing with custom software.

SPECIFICATION	
Sensor Type	InGaAs PIN-Photodiode
Active Pixel	320 x 256
Pixel Pitch	30µm x 30µm
Active Area	9.6mm x 7.68mm
Spectral response[1]	0.4µm to 1.7µm
Readout Noise (RMS)	<225 electrons (202 electrons typical)
Quantum Efficiency	>80% @ 1.5µm
Full Well Capacity	High Gain: 170ke-
Pixel Operability	>99%
Digital Output Format	14 bit Camera Link (Base Configuration)
Exposure time	500ns to [Frame Period – Readout Time]
Frame Rate	Up to 349.5Hz[2]
Trigger interface	Trigger IN and OUT – TLL compatible
Power supply	12V DC ± 0.5V
TE Cooling	Active
Image Correction	2 point NUC (offset & Gain) + pixel correction
Camera Power Consumption[3]	< 5W with TEC OFF, NUC ON <6W with TEC ON, NUC ON
Operating Case Temperature[4]	-20°C to +55°C
Storage Temperature	-30°C to +60°C
Dimensions (L*W*H)[5]	50mm x 74.59mm x 50mm
Weight	250g

Latest version available on www.raptorphotonics.com

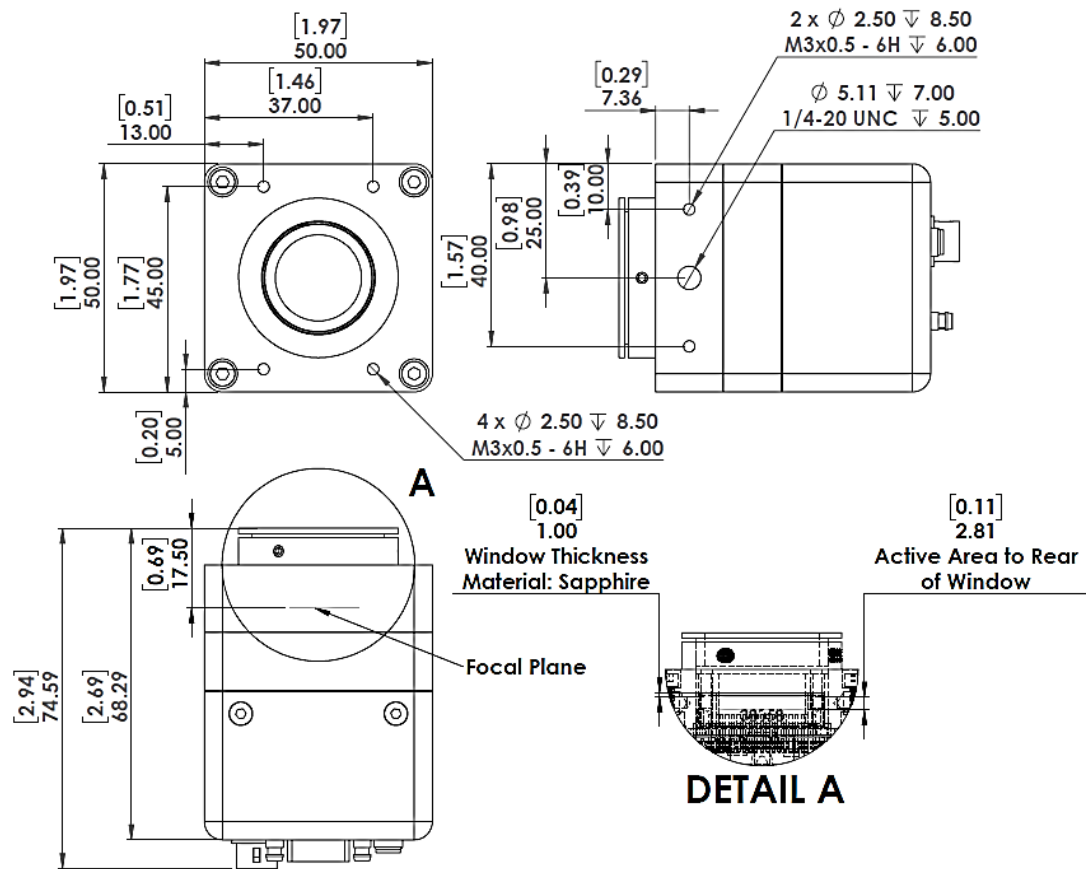Note 1: Optional filters available: Shortpass, Longpass or Bandpass
Note 2: Higher frame rates achievable when using ROI
Note 3: Measured in an ambient of 25˚C with adequate heat sinking
Note 4: Extended operating temperature range on request
Note 5: Dimensions include all connector parts on camera interface

2.2   Mechanical Outline

| [1.97] 50.00 |
| [1.46] 37.00 |
| [0.51] 13.00 |

[1.97] 50.00
[1.77] 45.00
[0.20] 5.00

[1.57] 40.00
[0.98] 25.00
[0.29] 7.36
[0.39] 10.00

2 x ⌀ 2.50 ⯯ 8.50
M3x0.5 - 6H ⯯ 6.00

⌀ 5.11 ⯯ 7.00
1/4-20 UNC ⯯ 5.00

4 x ⌀ 2.50 ⯯ 8.50
M3x0.5 - 6H ⯯ 6.00

A

[0.69] 17.50
[2.94] 74.59
[2.69] 68.29

Focal Plane

[0.04] 1.00
Window Thickness
Material: Sapphire

[0.11] 2.81
Active Area to Rear
of Window

DETAIL A

3D drawings (STEP) are available upon request.

3.   GETTING STARTED

3.1   System Overview

3.2   Mounting to Microscope

The Owl 320 High Speed has a standard C-Mount that should easily screw onto any microscope port.

3.3   Mounting to a tripod or optical table

The camera has a ¼-20 BSW (Whitworth), threaded hole to mount to a tripod or an optical table. The image below shows an optical table mount with the ¼-20 BSW thread.

¼-20 BSW
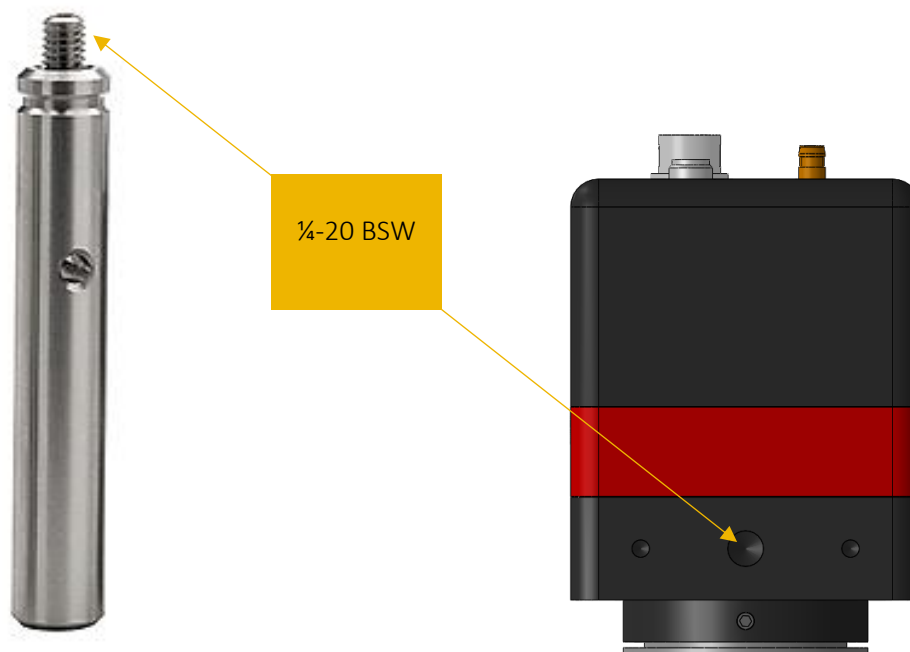
3.4 3rd PARTY SOFTWARE

Raptor supports a range of 3rd party software packages as per the matrix below.

	XCAP	XCLIB	NI Labview	Micromanager
Hawk 252	☑	☑		
Falcon II	☑	☑		
Falcon III	☑	☑		
Eagle	☑	☑	☑	☑
Owl 320	☑	☑	☑	☑
Owl 320 High Speed	☑	☑		
Owl 'Mini'	☑	☑	☑	☑
Owl 640	☑	☑	☑	☑
Ninox 640	☑	☑	☑	☑
Owl 1280	☑	☑		

☑ - Software tested by Raptor Photonics

☑ - Software tested by other companies

Blank - The camera has not been tested or is not supported by this software

In this guide, there is a quick overview of XCAP (http://www.epixinc.com/support/files.php) and Micro Manager (https://micro-manager.org). Should you have other software support specific needs, please do not hesitate to contact our sales team on sales@www.raptorphotonics.com.

3.5 Connecting your camera to a computer

- If using a laptop insert the Express Card to Camera Link adapter while the PC is switched off and make sure it is secure. If using a PC, insert the EPIX controller card into the correct slot of your PC. You can visit http://www.epixinc.com for further support issues.
- Insert EPIX software key dongle into a USB port (the red light on the dongle should light up).
- Boot up the computer.
- Use the Camera Link cable to connect the camera to the computer.
- Connect the other end of the Camera Link cable to the camera.
- Carefully thread the C-mount lens onto the camera's lens ring, rotating the lens in a clockwise direction until it is securely fastened. Use the lens controls to adjust focus. We suggest that the camera be mounted on a tri-pod or an optical bench.
- Connect the 12V power supply to the camera.

The Owl 640 camera is compatible with all types of CameraLink frame grabber. However, our cameras are extensively tested using Epix Inc. equipment's XCAP, for this reason we recommend XCAP software.

4. EPIX XCAP

For minimum computer system requirements, please contact Epix for the latest information.

4.1   Download and Install XCAP

Using the following link, http://www.epixinc.com/support/files.php, please select the appropriate version of XCAP for your computer. Please ensure you are downloading from the section labelled. *Pre-release version with support for the latest cameras and latest PIXCI® imaging boards.* Open the downloaded file when complete and follow the onscreen instructions. Be sure to accept the board driver installation.

4.2   Operating your camera using Xcap.

1. Open XCAP from within your operating system enabling administrative privileges.

2. Select PIXCI dropdown menu and select PIXCI Open Close, Figure 1 should appear.
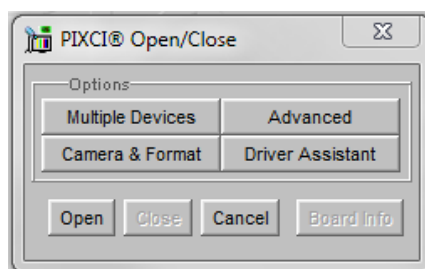
Figure 1: Open / Close

3. Select Close, and then Click on the Camera & Format button.

4. Using the dropdown menu scroll down and select Raptor Photonics OWL-CL High Speed from the list (Figure 2). Selecting OK when done.
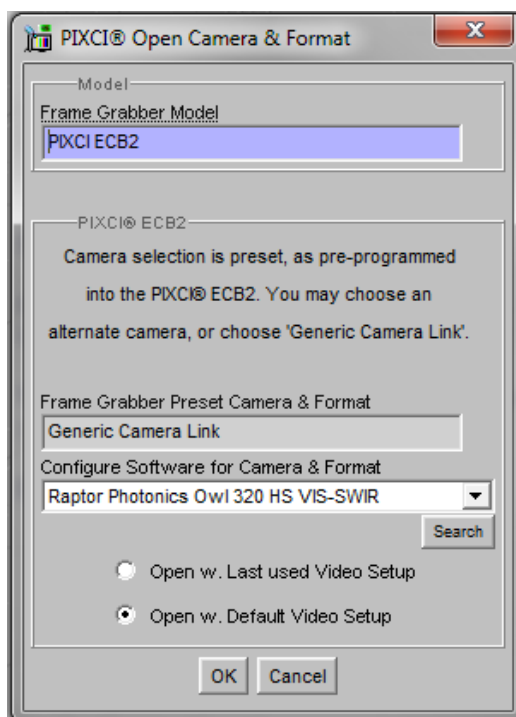
Figure 2: Camera Selection

5. Select Open and the viewing and control screens, Figure 3, will now open. Two windows should open (Figure), a viewing window (Left) and a control window (Right).
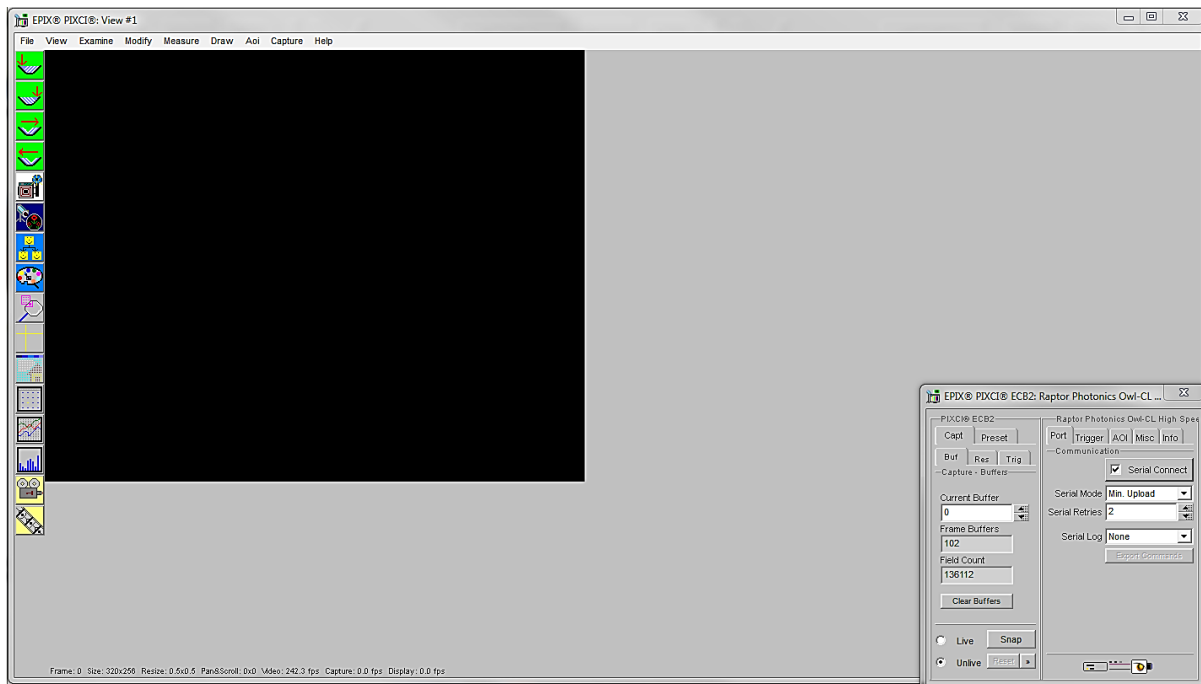
Figure 3: XCAP Camera Control Screen

6. The camera controls are pre-configured in EPIX.

7. The control window on the right should reflect your chosen camera. For example for the Owl 320 High Speed, it should read - EPIX PIXCI ECB2: Raptor Photonics Owl-CL High Speed. If not, you need to select a different camera.

8. Check that the camera is communicating, see animated icon (Figure 4) on bottom right of control screen.

Figure 4: Active Communication

9. You are now configured and connected, ready to acquire an image.

10. Check the Serial Connect box (to establish serial communication to the camera). This should contain a tick (as circled in Figure 5).

11. Check the live button (as circled in Figure 5).
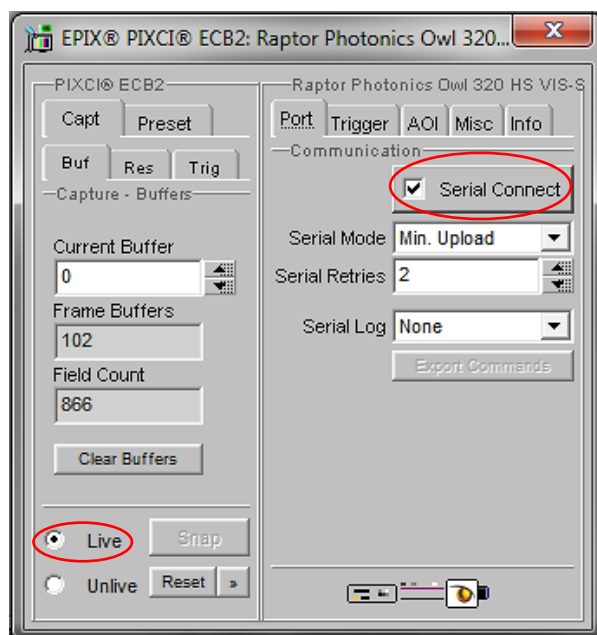
Figure 5: Image Capture

12. You should now see an image. On the bottom of the screen, you should see something similar to the following: *Frame: 0 Size: 320 x 256 Resize 0.5x0.5 Video: 25.0fps Capture: 25.0 fps Display: 25.4fps.*
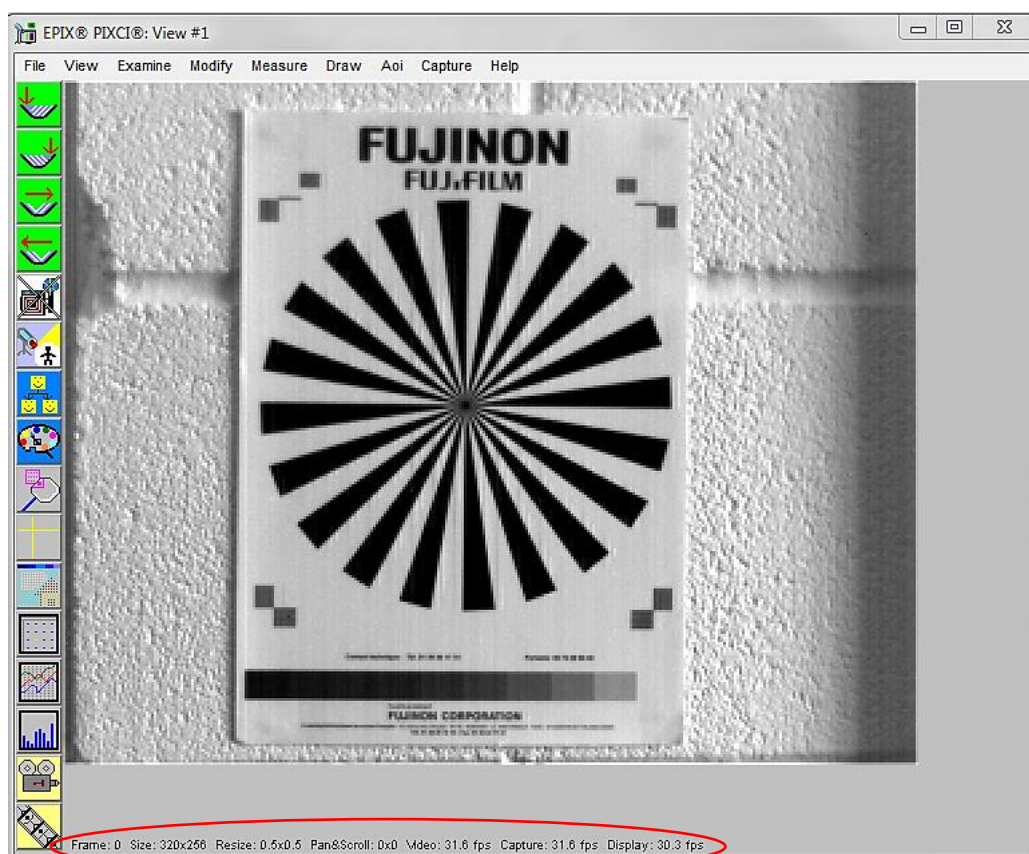

Figure 6: Live Image Capture Window

Changing the settings on XCAP

You have the ability to change several settings to control the camera through the tabs in the control window of the EPIX software.

4.4   Frame Rate and Exposure

You can also adjust the exposure and frame rate in most tabs. XCAP will automatically lower the frame rate if you input an exposure too long. Likewise, if you input a frame rate too long for the exposure time the exposure time will be reduced. This feature can be accessed by clicking on Trigger, AOI, Misc and Info tabs.

4.5   Trigger

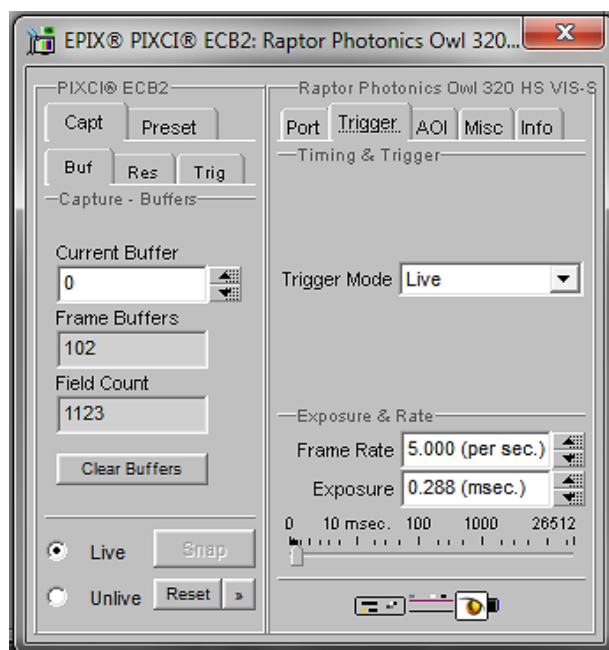Use this tab to select the Readout Mode. The available options in the drop down menu are Live or Ext. Triggered.
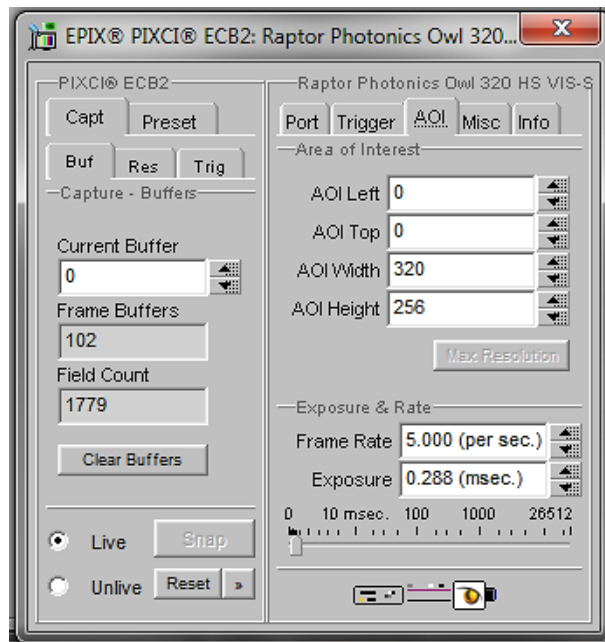

Figure 8: Trigger Tab

4.6   AOI

Area of interest (AOI). By selecting an AOI you will be able to increase the maximum frame rate of the camera to achieve higher frame rates, the minimum window selectable is 32 x 8.

4.10   Miscellaneous
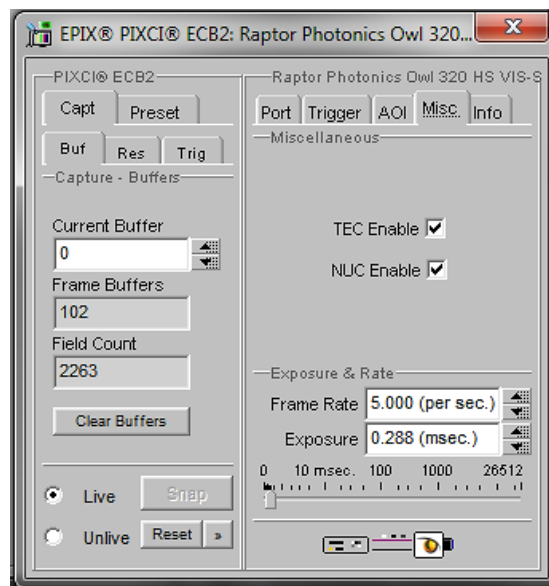
There are two features here, TEC and NUC.

Figure 17: Camera Information

4.8   NUC

On this tab, you can select the parameters for the on-board Non Uniformity Correction (NUC); select the 3point NUC Offset, Gain & Dark shown in Figure 13. Figure 14 and Figure 15 show the effect of the NUC off and on.

Figure 14: NUC Off   Figure 15: NUC On

4.9   TEC

Thermoelectric Cooling (TEC). Use this tab to set the sensor to a predetermined stable temperature. This is the temperature that the NUC has been performed at, so will give the best performance.

Info

The Info tab can be used to view the cameras manufacturer data, for example Build date and serial number.
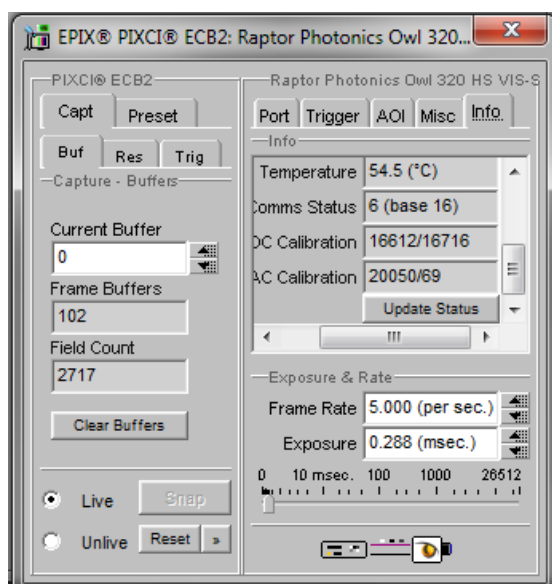

Figure 18: Information Tab

4.11   Adjusting the image display (With XCAP Std only)

The Viewing Pallet is not automatically adjusted in the XCAP software.

This needs manually Configured to give the best display of the RAW image data from the camera.

1. Go to the Modify/Contrast Modification menu, Figure 19.

2. Select "Stretch Contrast, Histogram Percentile Endpoints" and "Preview" Figure 20: Stretch Contrast.

3. Adjust the "Low Percentile Endpoint" and "High Percentile Endpoint" to optimize the image display, defaults should be acceptable for most applications.
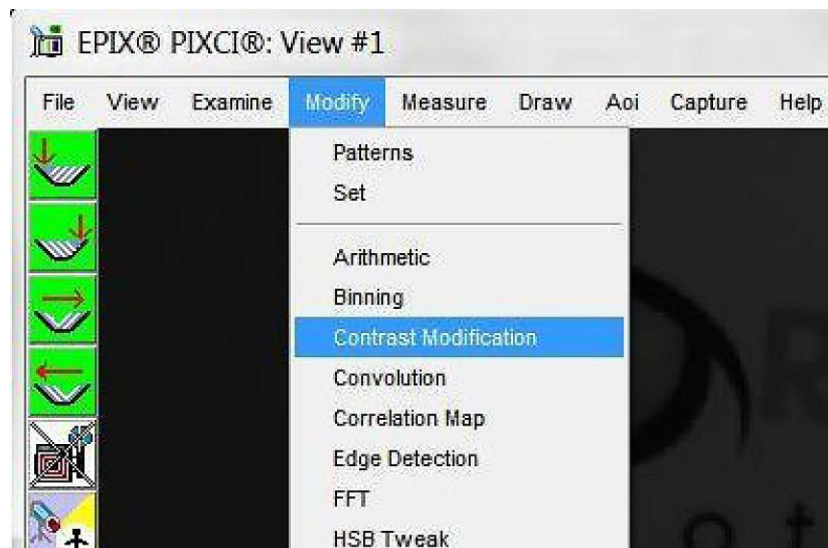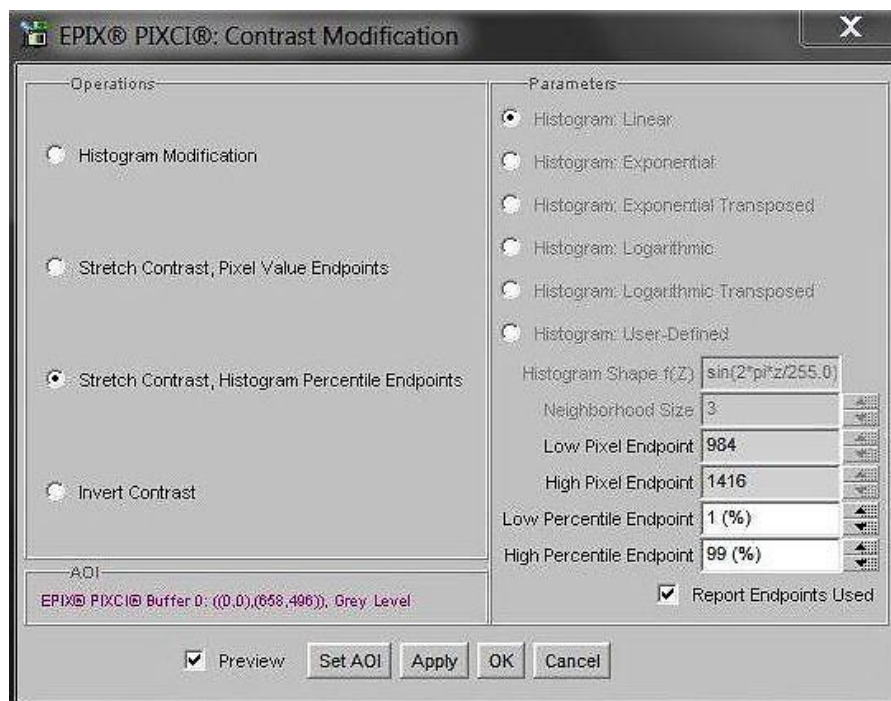

Figure 19: Contrast Modification

Figure 20: Stretch Contrast

CORPORATE HEADQUARTERS

Raptor Photonics LTD
Willowbank Business Park
Larne, Co Antrim
BT40 2SF
Northern Ireland
PH: +44 2828 270141

www.raptorphotonics.com