

Topic

This technical note discusses the operation and use of the Zeiss AxioCam HRc (color) and HRm (monochrome) cameras with Openlab

Discussion**Hardware**

The AxioCam camera head is supplied by Carl Zeiss with:

a PCI interface board

a fiber optic cable for data transfer between the camera and the PCI interface board

a power supply

power cable

The PCI card requires one free PCI slot. The PCI slot must support 5V keyed PCI cards.

Software

Mac OS 9.2.2 or Mac OS X 10.2.8

Openlab (OS X support in Openlab 3.1.5r5 or later)

Video Manager

AxioCam Video

Drivers for Mac OS 9 are installed automatically by the Openlab installer. Drivers for OS X are available in the Openlab Hardware Drivers Pack.

Connecting the camera to a microscope

The AxioCam has a standard c-mount thread. A c-mount adapter will therefore be required to attach the camera to a microscope.

Cabling

Connect one end of the fibre optic cable to the PCI card connect the other end of the cable to the camera head. Connect the power supply to the camera head.

There is no on/off switch for the camera, disconnect the power supply to turn the camera off.

Video Manager configuration

In Openlab select “Video Manager” from the “Special” menu. In the Video Manager dialog select “AxioCam” as the input.

Start up order

Ensure the camera is powered before starting Openlab. This will assist recognition of the camera in Openlab.

Supported controls

Exposure

Size:

1300 x 1030 [fast]

1300 x 1030 [high quality]

1300 x 1030 scanned

2600 x 2060 scanned

3900 x 3090 scanned

Depth (Axiocam HRC only), monochrome or color

Binning

Digital Gain

Colorization (for monochrome camera and color camera in monochrome mode)

Available binning modes for the different resolutions of the Axiocam HRC color camera:

Resolution	Depth		Binning				
	Color	Monochrome	X1	X2	X3	X4	X5
1300 x 1030 fast	X		X		X		X
1300 x 1030 fast		X	X	X		X	
1300 x 1030 high quality	X						
1300 x 1030 scanned	X						
2600 x 2060 scanned	X						
3900 x 3090 scanned	X						

Image size and memory requirements

The images produced by this camera are large (47MB for 3900*3090 full color). If using Mac OS 9 ensure a minimum of 256 MB memory are allocated to Openlab.

What does the Black Ref. Button do?

This allows black level calibration to be performed and is recommended when using exposures greater than 3 seconds.

How do I identify the brightest and darkest pixels in the image?

You do this as you would with any other monochrome digital camera – by using the colorization option to color the bottom and top most pixels blue and red respectively. The colorization level describes the ranges of pixel intensities to be displayed.

Don't forget to switch the colorization back to 0 before capturing the image.

How do I white balance an image?

The AxioCam is designed to have the default white balance optimized for the color temperature of 3200K. View the live preview and click the "White Balance" button in the video controls palette.

White balance will operate on a region of interest (ROI) drawn on the image, which allows the user to select an object or part of an object that is white or is to appear white in the final image, before clicking the White Balance button. In the absence of an ROI, the whole of the current active document is used so the sample must be moved to present the camera with a white scene such as an area of slide free of cells, before clicking the White Balance button.

What are 'sampled' modes?

This is the patented procedure implemented by Zeiss that allows the user to select real resolution (i.e. without interpolation methods which are used in the low quality/high quality modes) in an area 1300 x 1030, 2600 x 2060 and 3900 x 3090. The CCD is shifted physically to a new position depending on the resolution chosen.

Openlab displays an image as millions of colors how does this compare with the Zeiss 42-bit color image?

The AxioCam produces 14bit data for each color channel resulting in a 42-bit color image. Openlab does not handle more than 8 bits per channel. The 14 bit data is scaled to 8 bits in exactly the same way as when using 'digital gain'.

Why can I see a color mosaic pattern in the image even at maximum resolution?

This is evident if the object has moved during the exposure and is more obvious as the resolution and hence the time taken to produce the final image increases. The CCD is 'scanned' to produce the high resolution image and any object that is moving will cause differences in the images at different scan positions. When they are 'summed' to produce the final image any differences appear as a mosaic of different color pixels.

Known problem with AxioCam driver installer on OS X 10.2.6

During the installation process users may experience a slight problem for which there is an easy workaround described here.

After double-clicking on the installer icon AxioCam_HR_Package.mpkg the installer will require the name and password of a user with Administrator privileges for that computer.

After these are correctly entered the 'select a destination' screen is shown.

It is at this point that users are meant to select the destination disk for the installation of the software, it must be the same disk on which Openlab is installed. However this disk may be covered by an exclamation mark in a red circle and the message

“You cannot install this software on this disk (null)”

Click “Go Back” to return to the previous screen, click “Continue” on this screen. The “Select A Destination” screen should be shown but installation of the Axiocam drivers should now be permitted.

This problem does not occur with Mac OS X 10.2.8.