



CameraViewer

User's Manual

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1 Introduction

This document gives a description of the C-Cam utility CameraViewer, a compact application programme designed to provide basic experience with the BC-family of CMOS cameras.

The programme is written in Visual Basic and makes use of interface routines in the user libraries CCAPI.DLL and CCUTIL.DLL

It is recommended that first-time users begin by displaying images from a camera by using CameraViewer. This will then rule out any hardware issues that could prevent a camera from working.

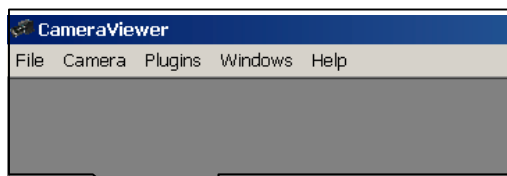
In addition, CameraViewer has several built-in features that can be used to calibrate a camera and determine the correct parameters for camera usage.

2 Starting CameraViewer

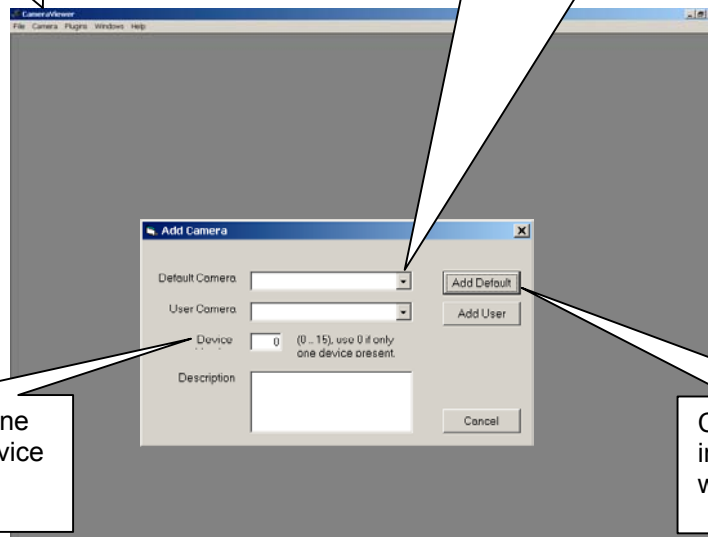


Start CameraViewer

Choose **Add Camera** in the **Camera** menu



Click on the list box Default Camera and choose the camera to be viewed.

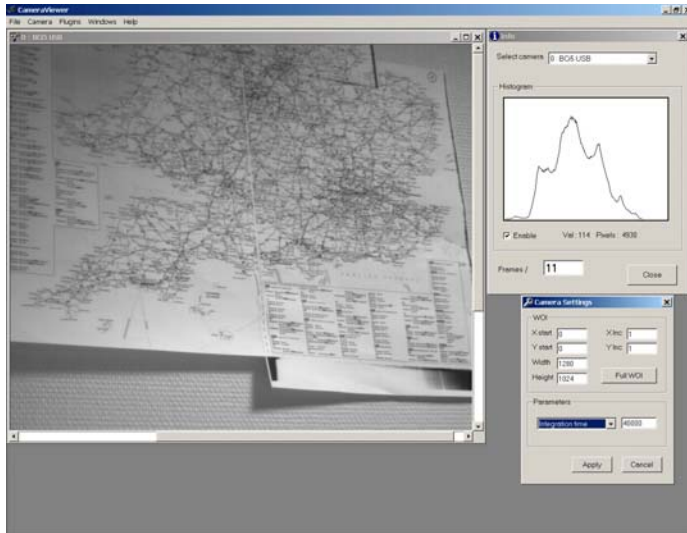


If using more than one camera then set Device to 0, 1, 2, etc.

Click Add Default to initiate communications with the camera

The camera will now be loaded with it's logic programme (.TTB-file) and prepared for use according to pre-defined settings in the file CameraViewer.INI

3 The Main Screen

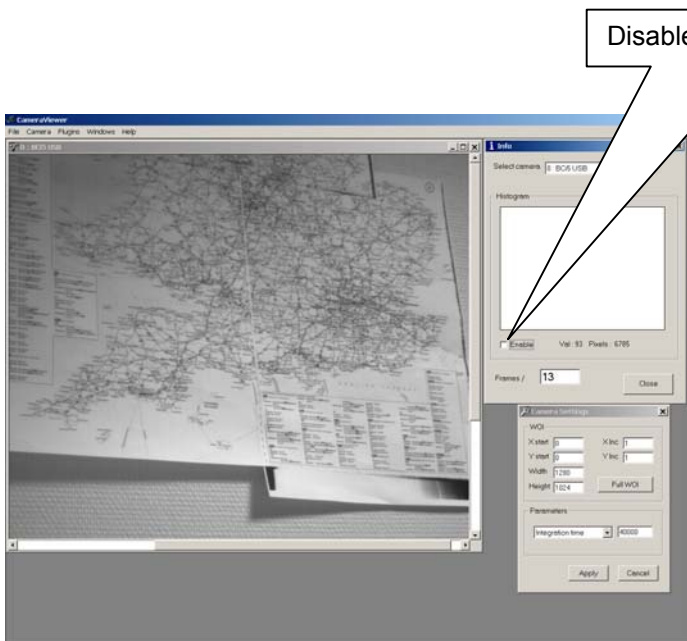


CameraViewer will immediately start to acquire and display images.

The Histogram shows the intensities present in the image.

This histogram has no pixels that are too dark (vertical stripe on the left), or too light (vertical stripe on the right).

But we see that the frame-rate is lower than the 13 fps specified for the BCi5 using an integration time of 40ms.



Disable the Histogram

Disabling the Histogram reduces the processing time of CameraViewer and results in (almost) the maximum frame-rate.

Window-of-Interest

Set the Window of Interest dimensions and click **Apply** to change to display width and height. Click Full WOI to return to the maximum dimensions

4 The Histogram

Information about the displayed image is given in the Info window.

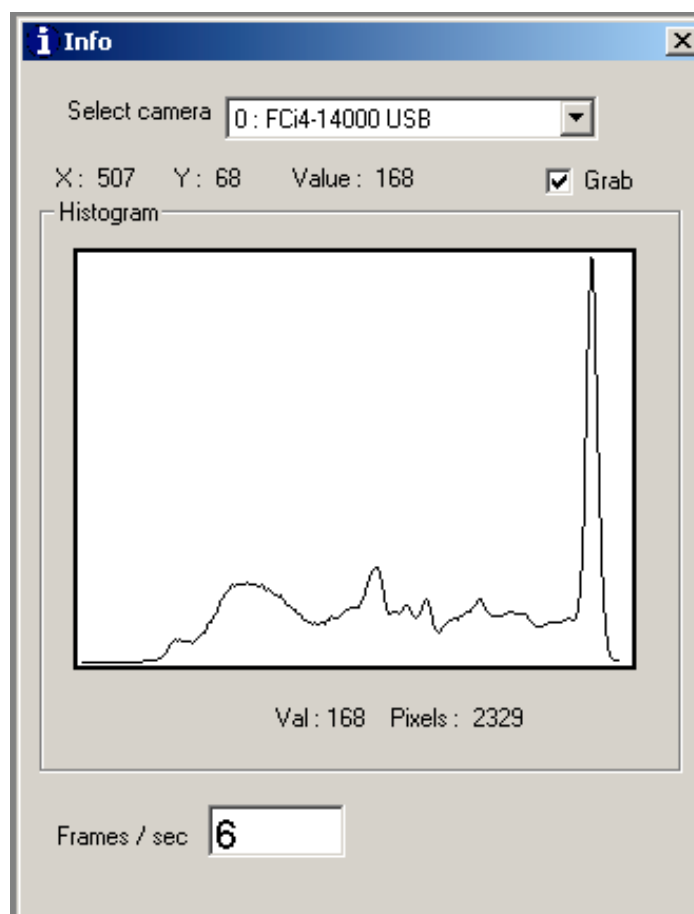
X: and **Y:** The coordinates of the cursor pointing inside the image display
Value: The Intensity of the pixel being pointed at.

Val: The position of the cursor in the histogram [0..255].

Pixels: The number of pixels in the image with this value.

If an acquisition error occurs then the **Grab** checkbox is cleared and the camera stops. Check the Grab box again to restart acquisition.

Note: This reaction to an error can be disabled with the entry "**StopOnError=0**" in the initialisation file CVProgram.ini



5 The Initialisation File

The file CameraViewer.INI contains the default settings for each type of camera in the BC- and FC-family.

When CameraViewer is started, these settings are read and sent to the camera.

The default settings have been chosen in order to generate an image under normal conditions.

According to the lighting conditions, etc. it may be necessary to modify the default values.

On the Main Screen there is a list-box of common parameters that can be adjusted for image correction.

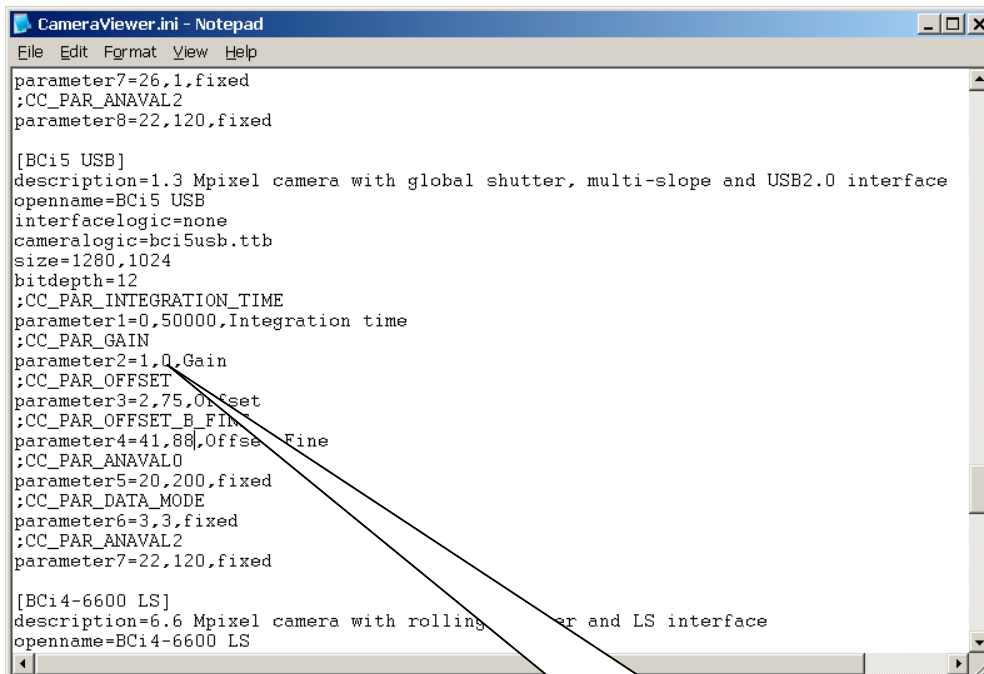
The parameters available in the list-box are defined in the .INI file in the following way:

Parameter_x=reg, value, name

Where:

- ***x*** is a sequence number for the parameter in the .INI file
- ***reg*** is the address of the camera register defining this parameter
- ***value*** is the numerical value of the parameter
- ***name*** is the text that will appear in the list-box for user selection

If the name is “***fixed***” then this parameter is not available for the user in the list-box, but will be initialised to “***value***” when the camera is opened.



```

CameraViewer.ini - Notepad
File Edit Format View Help
parameter7=26,1,fixed
;CC_PAR_ANAVAL2
parameter8=22,120,fixed

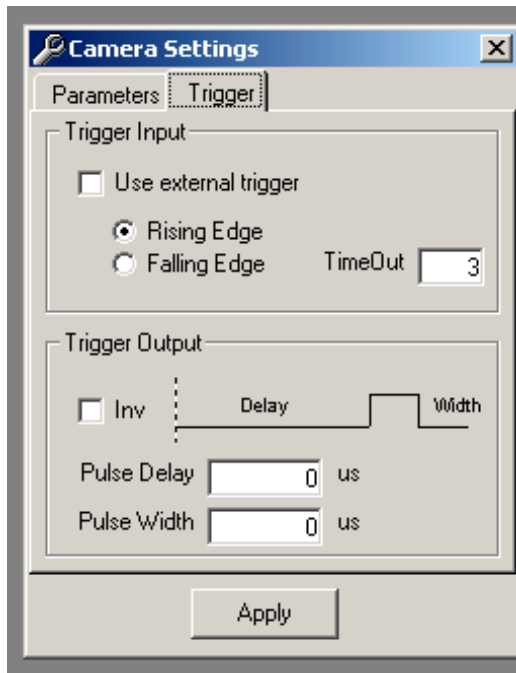
[BCi5 USB]
description=1.3 Mpixel camera with global shutter, multi-slope and USB2.0 interface
openname=BCi5 USB
interfacelogic=none
cameralogic=bci5usb.ttb
size=1280,1024
bitdepth=12
;CC_PAR_INTEGRATION_TIME
parameter1=0,50000,Integration time
;CC_PAR_GAIN
parameter2=1,0,Gain
;CC_PAR_OFFSET
parameter3=2,75,Offset
;CC_PAR_OFFSET_B_FINE
parameter4=41,88,Offset_Fine
;CC_PAR_ANAVAL0
parameter5=20,200,fixed
;CC_PAR_DATA_MODE
parameter6=3,3,fixed
;CC_PAR_ANAVAL2
parameter7=22,120,fixed

[BCi4-6600 LS]
description=6.6 Mpixel camera with rolling shutter and LS interface
openname=BCi4-6600 LS
  
```

Modify the second value after the equals-sign

6 Trigger I/O

Click on the “**Trigger**” tab of the Camera Settings window to open the Trigger I/O menu.



Trigger Input:

Use external trigger – check this box to stop continuous image capture and cause the camera to wait for a trigger input

Rising/Falling Edge – determines the polarity of the trigger input. Rising requires an “active” input to enable the camera.

TimeOut – number of seconds to wait for a trigger to arrive. Set to zero to wait forever!

Trigger Output:

Inv – Will invert the output, issuing a pulse to ground

Pulse Delay – Time between trigger input and output pulse

Pulse Width – Duration of the trigger output

Click “**Apply**” to send the chosen settings to the camera.

Note: The trigger input of a BC camera is level-sensitive. That means that if the input is held active then the camera will continue with a new acquisition when the last one is finished. A short pulse is sufficient to trigger an acquisition.

The FC cameras have a more complex trigger facility. Please refer to the corresponding manual for full details.

Normally the trigger settings are only sent once, before using the camera. Changing the polarity of the trigger input on-the-fly could cause the camera to stop, requiring a reset.

Full details about the trigger operation is given in the Trigger I/O Manual.

7 Saving Images

To write the current image to a file, right-click on the image and select **Save**.

The image is saved under a filename corresponding to the name of the camera in use, in the sub-directory “**Images**” of CameraViewer.

Each image filename has a number that increments with each “save” operation.

Use the “**Save As**” command in the **File** menu to determine the format of files to be saved. The options are BMP, RAW, and TIFF.

7.1 Saving a sequence of images:

From the “**Plug-ins**” menu, select “**Stream**”.

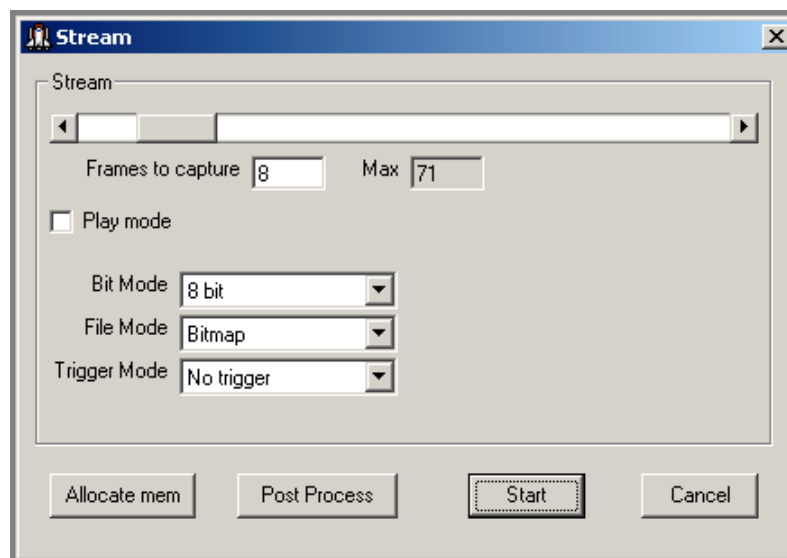
Start by allocating enough memory to contain the images you want to acquire.

Define the number of images to be acquired. (Not more than the Max shown for the available memory)

Select the Modes for saving and the trigger mode.

Click on “**Start**”.

A stream of images will be acquired and written to individual files in the Cameraviewer directory and called “**seqxxxxx.ext**” where **xxxxx** is an incrementing number and **.ext** is the file type chosen..



8 Stretching the Histogram

To view a section of the histogram in more detail we can engage Histogram Stretching.

Select the lower and upper pixel intensities and select **Enable** to change the histogram window.

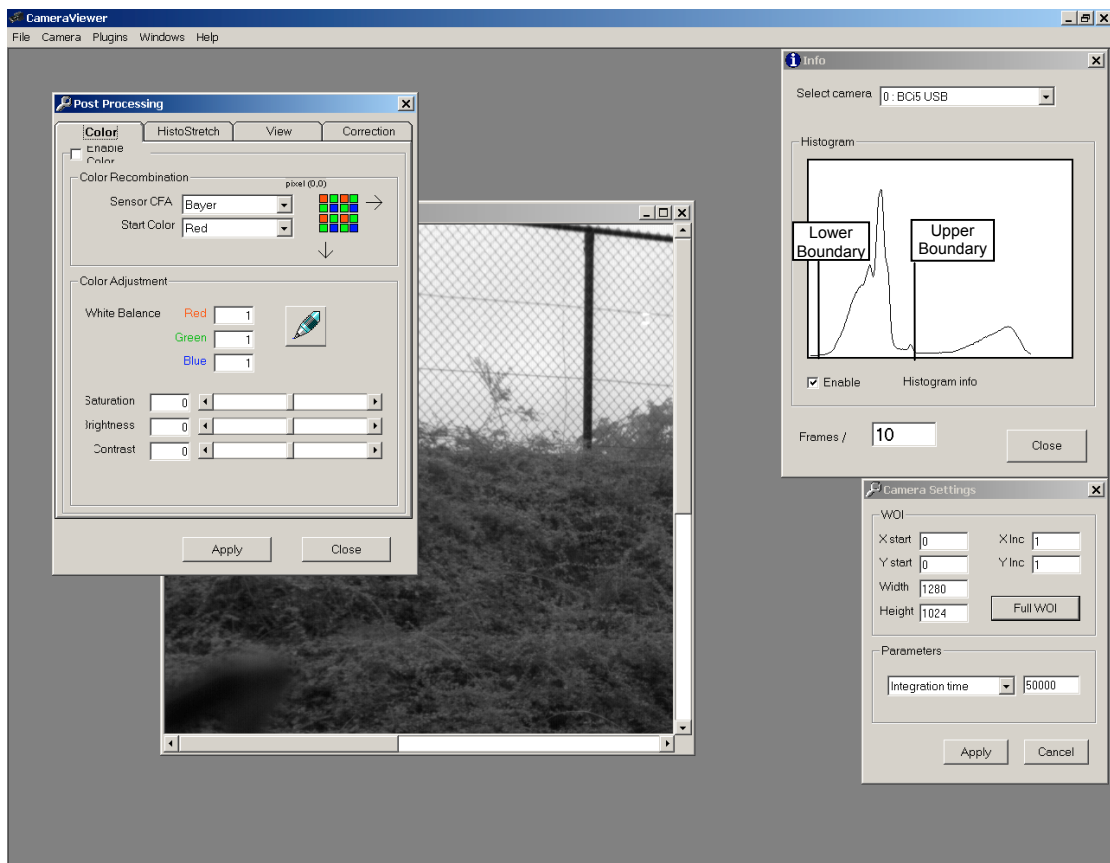
Now only the selected portion of the histogram is displayed, in the full width of the window.

To have the upper and lower boundaries automatically calculated, select **Auto**.

Now the histogram is scanned to select the most interesting portion.

Select a threshold in order to allow the automatic selection to exclude a number of pixels from the stretched graph.

Note: Not only is the histogram stretched but in the image displayed all pixels are recalculated (scaled) to fit between the minimum and maximum boundaries





9 “Color”

The colours of a Bayer pattern sensor can be extracted using this screen. Select **Enable Colour** to activate the extraction algorithm. (Note: the frame-rate will decrease as the processor is loaded with this task)

Select the colour pattern for the camera in use: **Bayer** or **RGB diagonal**.

Select the start colour of the window being viewed. There are four possible starting colours, displayed on the colour matrix icon. (Please refer to the camera’s User Manual for details about colour filters)

The Red, Green and Blue weighting factors balance the colours. For automatic calculation, click on the pen (the RGB values are all set to 1) then click on a place on the image that should be white or grey. The automatic function will now adjust the Red, Green and Blue content in an attempt to reproduce the chosen pixel as white.

10 Multi-Slope

To set and view the effects of the multi-slope features we must start the BCi5 camera in a special mode.

From the **Main Menu** select **Camera**, “**BCi5 Control**” and then open a camera using one of the BCi5 interface options.

A control menu appears where you can configure the multi-slope parameters and view the effects.

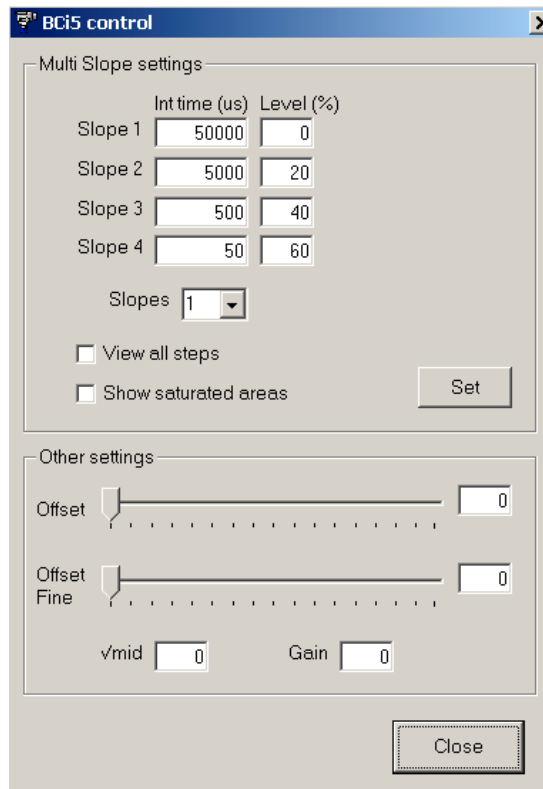
The initial values of slope integration times and level should give a reasonable starting point. Alter these values and click on “**Set**” to apply the new settings.

The “**Slopes**” selector defines how many sections of the multi-slope operation are active.

Select “**View all steps**” to see a separate window for each of the sections of the multi-slope operation.

Select “**Show saturated areas**” to highlight the areas of the image that still require multi-slope processing in order to prevent saturation.

Other values that also contribute to the image quality are adjustable. E.g. **Offset**, **Offset_Fine**.





11 Revision History

10/02/2009	Removed Offset-Fine adjustment Added Trigger description & Save file

End of Document