

### Parameter change in real time – Using the sequencer mode

You want to capture image sequences with different exposure times or image sections? You do not want to manually reconfigure the camera while capturing? That is not quite easy? Yes, it is!

A special feature that was previously reserved for the camera models with e2v sensors, is now available for the whole USB 3 uEye CP Rev. 2 camera family from IDS Software Suite 4.81 on: the sequencer mode. To help you get started, there is a special “uEye sequencer demo”.

#### Background

Unlike the existing sequence AOI mode of the e2v sensors, the new sequencer mode is no special sensor feature, but implemented in the camera firmware. So this feature is available in much more camera models and its programming remains consistent and the functionality is extendable.

With the new sequencer mode, you are able to define up to 32 sequencer sets with different parameters for image acquisition. Each sequencer set includes the following settings:

- Exposure time
- Gain (master, red, green, and blue)
- X and Y position of the image section (AOI)

The sequencer sets **are stored in the camera**. So they can be processed by the camera firmware while capturing without interaction with the host software. Parameter changes happen **automatically** and **without delay** of the capture process. You can determine the **order** of the sequencer sets on your own. This allows fast parameter changes for image acquisition in **real time**.

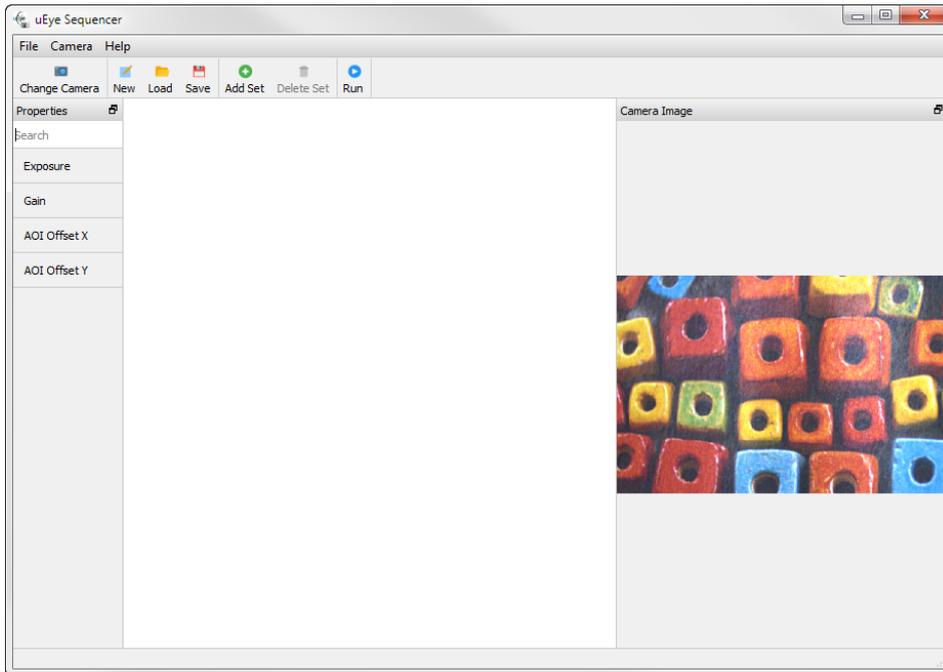
With the new “uEye sequencer demo”, you are able to try out and preconfigure the sequence mode very comfortable for your application.

#### Setting up the camera

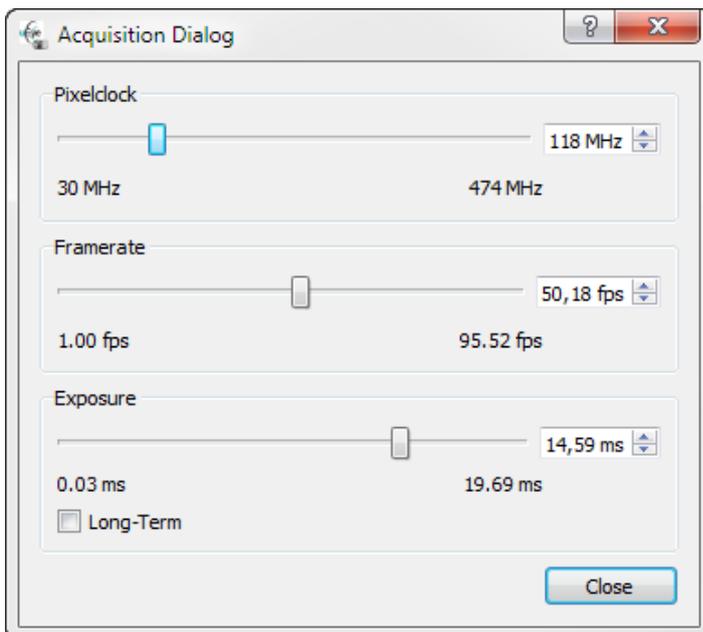
Start the uEye sequencer demo with “Start > All Programs > IDS > uEye > Samples > uEyeSequencerDemo”. Select a USB 3 uEye CP Rev. 2 camera in the “Select camera” dialog to start the program.

## TechTip: Using the sequencer mode

### Starting the uEye sequencer demo

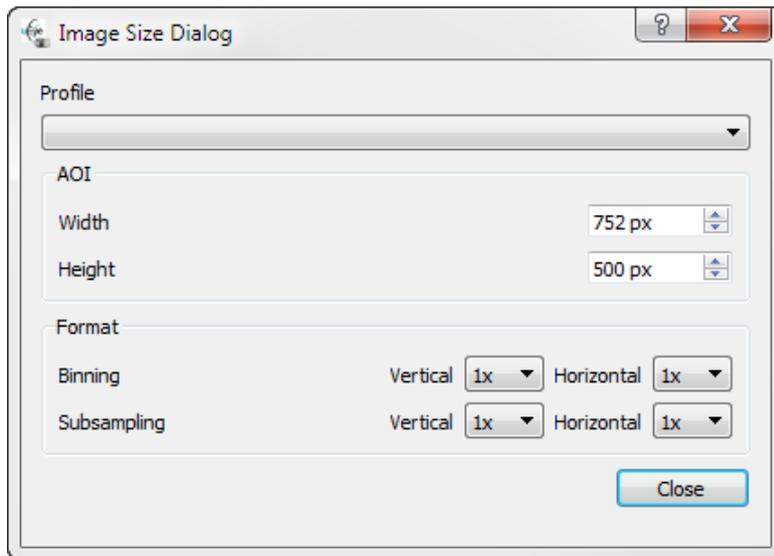


First, adjust the basic camera settings. Via “Camera > Acquisition”, you can set the pixel clock, the frame rate and the exposure time.



“Acquisition” dialog

Via “Camera > Image Size”, you can choose an image profile, define an image section (AOI), or set binning and subsampling.



“Image size” dialog

### Alternative camera configuration: Using the uEye Cockpit

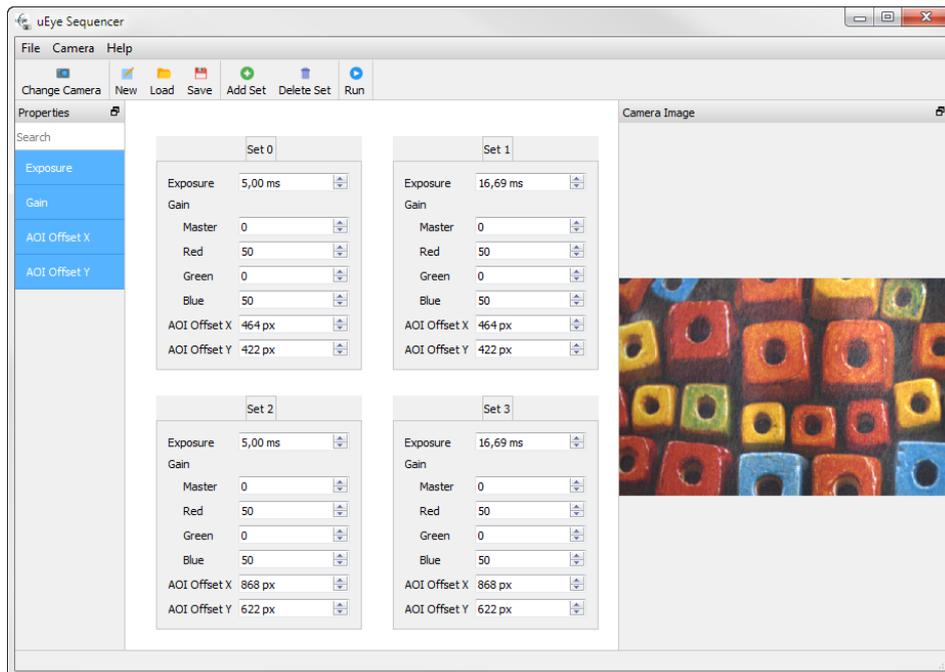
You can also comfortably configure the camera in uEye Cockpit. Save the camera settings in a parameter file (see TechTip [“Parameterizing instead of Programming”](#)). You can load the parameter file in the uEye sequencer demo via “Camera > Load Camera Configuration”.

### Configuring the sequencer mode

After configuring the basic camera settings, you set up the sequencer mode. Click on the “Add Set” button in the menu bar to add the first sequencer set. The sequencer set is still empty. Next, for example, add the exposure time that should differ from the default value. For this, click on “Exposure” at the left side in the “Properties” area. In the first sequencer set, the input field for the exposure time is displayed and you can change it.

In the same way, you can set gain and AOI position (AOI offset X/Y). Add a further sequencer set by clicking on “Add Set”.

Each new sequencer set is automatically added at the end and has the same settings as the currently marked sequencer set.



Configured sequencer sets

### Saving configuration

You can save the sequencer settings that you have made in the uEye sequencer demo. Via “File > Save”, you save the sequencer settings in a XML file.

You can load saved sequencer settings via “File > Load” into the uEye sequencer demo. In your own application, use the “is\_Sequencer()” API function with the IS\_SEQUENCER\_CONFIGURATION\_LOAD parameter to load the preconfigured sequencer settings. This saves you programming effort in your application as you simply load the sequencer settings and activate the sequencer mode.

### Using the sequencer mode

After you configure or load the sequencer sets, click on “Run” in the menu bar of the uEye sequencer demo to start the sequencer mode. The images are captured continuously until you click on “Stop”.

For demonstration, the uEye sequencer demo uses a continuous software trigger signal to trigger image capture and a ring buffer to store the image data.

The sequencer mode only works in camera **trigger mode** (software or hardware trigger). According to your application, you can trigger the differently parametrized images by single trigger signals, or use a trigger burst, for example, to start capturing a complete image sequence with one signal.

## TechTip: Using the sequencer mode

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### Application areas

The sequence mode is useful to capture an image section with different exposure times or gain settings. For example, in situations where unknown light or brightness conditions prevail. You can realize bracketing or calculate an HDR image by software.

Also image sections with different positions could be realized quickly in this way. Moving the image section is applied directly in the sequencer mode without reprogramming via the API.

Remember using sufficient ring buffer according to your application. With the possibility to capture fast image sequences with different parameters, also the amount of data for image processing will increase.

### Summary

The sequencer mode can be very useful for applications where image series with different parameters are to be captured in a very short preset time period and manual parameter changes are too time-intensive.

As the capture parameters are automatically changed directly in the camera in sequencer mode and not via the PC, a capture with parameter changes is possible in real time. This allows an optimized process sequence.

Note the following prerequisites for using the sequencer mode:

- The sequencer mode is supported by all USB 3 uEye CP Rev. 2 cameras but not by the UI-359xCP Rev. 2 camera model.
- The sequencer mode is only supported in trigger mode. Both hardware and software triggers are possible. Triggers for single images as well as the burst trigger mode for complete image sequences are supported.
- The sequencer mode must be activated before the image acquisition starts.
- The internal image memory must be activated.
- The sequencer mode cannot be used in combination with the IDS line scan (AOI merge mode), multi AOI function, or the sequence AOI mode.

For further information on programming the sequencer mode, refer to the uEye manual at <http://en.ids-imaging.com/manuals-ueye.html>.

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