

If the area scan camera turns into a line scan camera: Using the line scan mode

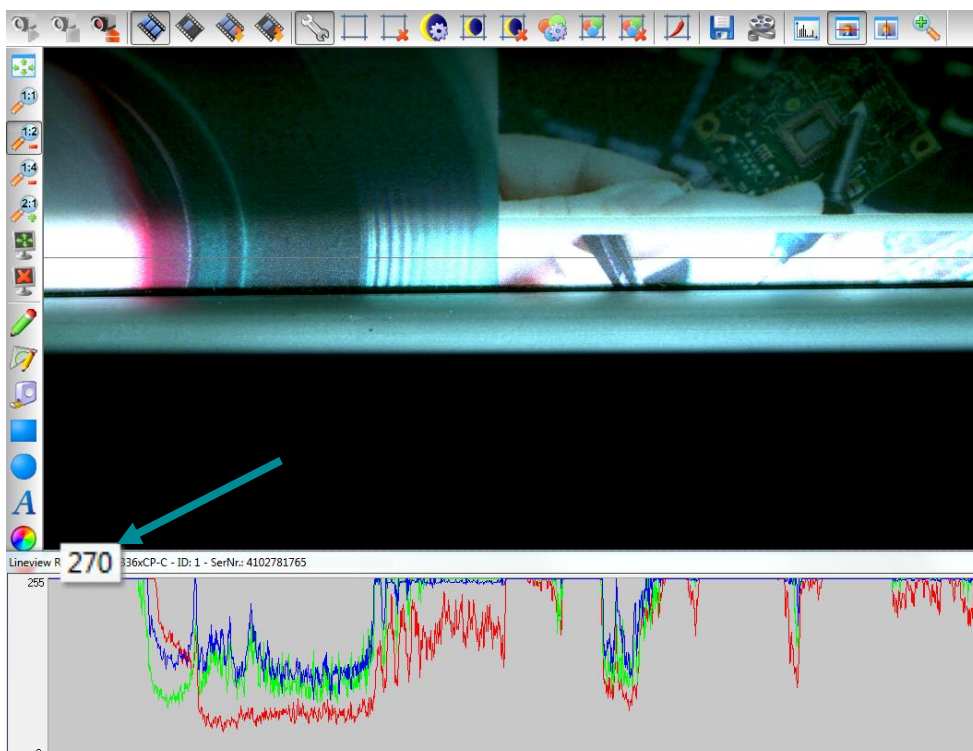
With the IDS Software Suite you can enable a line scan mode for specific GigE and USB 3 uEye models with CMOSIS, e2v or Sony sensors. This allows you to operate the area scan camera as a line scan camera. With the “Vertical AOI merge mode” function, you also have the option to trigger not only images but also lines.

Background

Area scan cameras capture a specific area as an overall image. This image is then processed. Line scan cameras, on the other hand, capture individual lines instead, which are then compiled by the respective software to form an image. The main advantage of line scan cameras is their high speed. The advantage of area scan cameras versus line scan cameras is that an area scan camera is relatively easy to focus and to be adjusted. In addition, area scan cameras are normally much cheaper. Depending on the application, the use of an area scan camera with line scan mode offers the advantage that the camera setup can be done very easily.

Activating line scan mode with AOI merge mode

First, open the camera as normal area scan camera in uEye Cockpit. Adjust the camera to the desired composition.



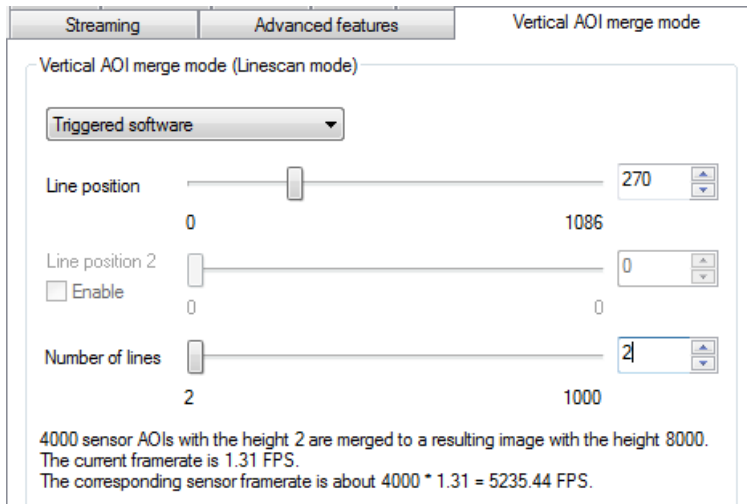
*Horizontal line view in
uEye Cockpit*

To define the ideal line position, use the horizontal line view. Open the window via “View > Line view (horizontal)” and move the line of the line view with the mouse to

the desired image area. The selected row position is displayed in the menu bar of the dialog.

Also check that the camera is operated in trigger mode so that you can use image and line trigger.

Open the camera properties via “uEye > Properties” and switch to the “Vertical AOI merge mode” tab. Enable the AOI merge mode via the drop-down list.



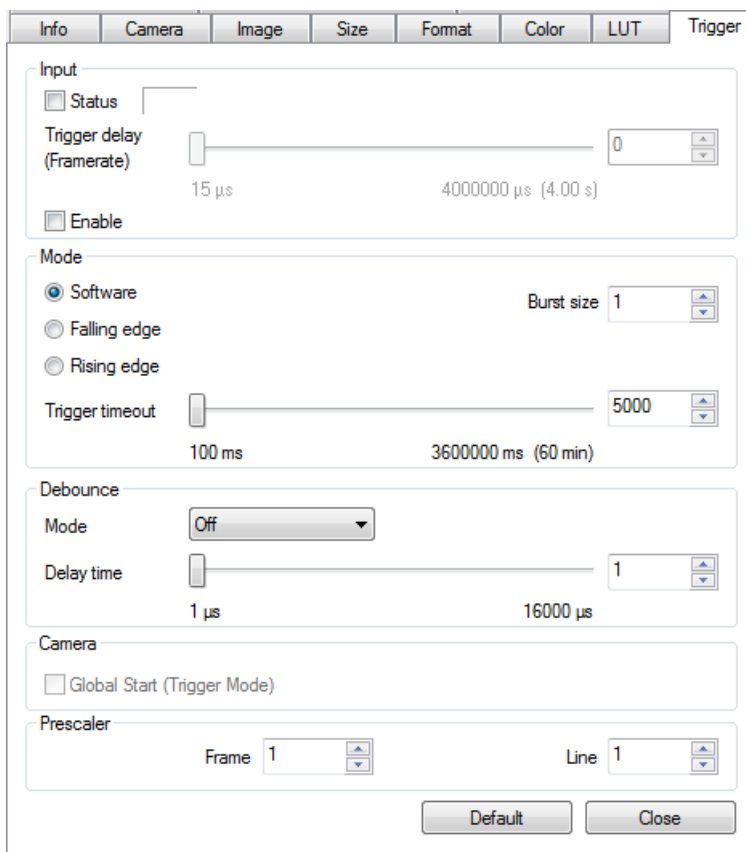
Enabling AO merge mode

Set as line position the line that you have identified in the horizontal line view. You can see the frames per seconds of the line scan mode in the lower part of the tab.

Line scan mode	Trigger for image capture	Trigger for line capture	Description
Off	-	-	Disabled the AOI merge mode.
Freerun	Freerun Software trigger Hardware trigger (trigger pin)	Freerun	Enables the AOI merge mode in freerun mode. The single AOIs are acquired in freerun mode with maximum speed.
Triggered software	Software trigger Hardware trigger (trigger pin)	Software trigger	Enables the AOI merge mode. The single AOIs are triggered via software.
Triggered hardware falling GPIO 1	Software trigger Hardware trigger (trigger pin)	Hardware trigger (GPIO 1, falling edge)	Line scan mode with frame and line trigger The single AOI is triggered on GPIO 1 (falling edge).
Triggered hardware rising GPIO 1	Software trigger Hardware trigger (trigger pin)	Hardware trigger (GPIO 1, rising edge)	Line scan mode with frame and line trigger The single AOI is triggered on GPIO 1 (rising edge).

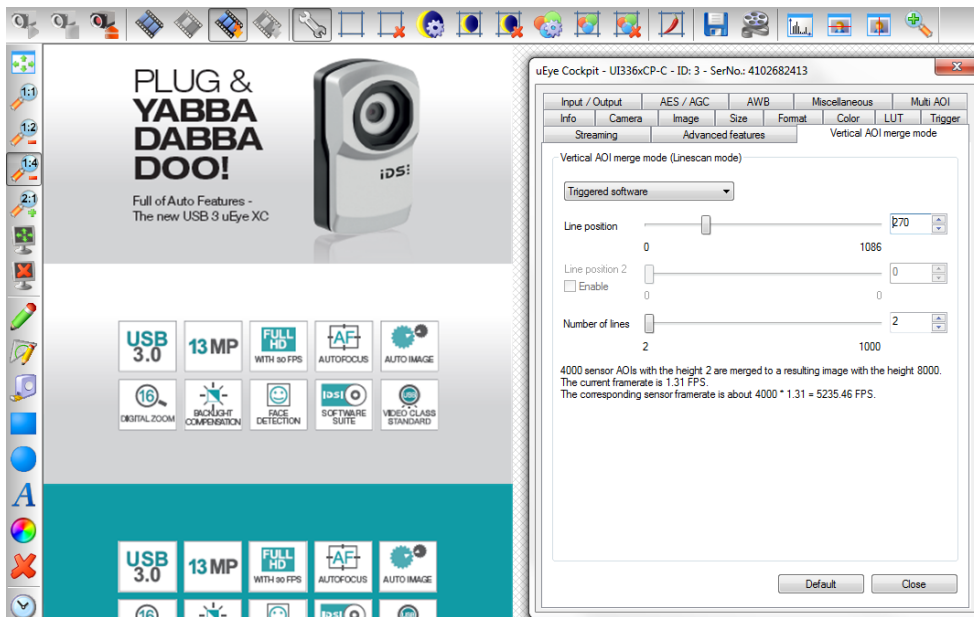
Line scan mode	Trigger for image capture	Trigger for line capture	Description
Triggered hardware falling GPIO 2	Software trigger Hardware trigger (trigger pin)	Hardware trigger (GPIO 2, falling edge)	Line scan mode with frame and line trigger The single AOI is triggered on GPIO 2 (falling edge).
Triggered hardware rising GPIO 2	Software trigger Hardware trigger (trigger pin)	Hardware trigger (GPIO 2, rising edge)	Line scan mode with frame and line trigger The single AOI is triggered on GPIO 2 (rising edge).

You do further settings for trigger mode on the “Trigger” tab. Here, you can set the trigger timeout or trigger prescaler among others. Via the trigger prescaler (frequency divider) you can set that the trigger signal is divided by the set value. This is necessary when the trigger signal delivers more pulses as needed for the captures. With the set value, e.g. 40, you define that the camera captures an image only every 40th trigger signal.



Trigger settings

When you operate the camera in line scan mode, the pixel clock is automatically set to the maximum possible value and the frame rate and exposure time to the minimum possible values.



Line scan mode with software trigger

Application areas

The line scan mode can be used almost exclusively in endless web inspection systems, for example of textiles, paper, wheel rims or even silicon wafers. It is not really suitable for print inspection or surface testing.

Summary

The line scan mode is suitable for wide range of simpler applications in endless web inspection systems. Simple setup and low system costs make it an affordable alternative to the original line scan camera.

With the uEye API function “is_DeviceFeature” or the uEye .NET class “AoiMerge” you can program the line scan mode.

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

Currently, the following camera models support the line scan mode:

USB 3.0	GigE
UI-3060CP	
UI-3240CP	UI-5240CP (in freerun mode only)
UI-3240LE	UI-5240SE (in freerun mode only)
UI-3241LE	
UI-3242LE	
UI-3240ML	

USB 3.0	GigE
UI-3250CP	
UI-3250LE	
UI-3251LE	
UI-3252LE	
UI-3250ML	
UI-3360CP	UI-5360CP (in freerun mode only)
UI-3370CP	UI-5370CP (in freerun mode only)

Authors

Marion Gentele, Technical Documentation
 Alexander Lewinsky, Product Management

Contact

IDS Imaging Development Systems GmbH
 Dimbacher Strasse 6-8
 74182 Obersulm
 Deutschland

Phone: +49 7134 96196 0

Email: marketing@ids-imaging.de

Web: www.ids-imaging.de

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