swingcatalyst

FLIR BLACKFLY S GIGE
Getting Started guide

HARDWARE SETUP

Follow these steps after unboxing your camera:

1 Attach the tripod adapter to the camera body using the 4 black Phillips head screws included with the camera.

2 Unpack the lens and make sure to remove the plastic lens covers.

3 Remove the sensor cover from the camera and attach the lens to the camera with a twisting motion.

ADJUSTING THE CAMERA LENS

This lens has three adjustments, from top to bottom:

1 **Focus:** Adjusting towards the ∞ symbol will make objects further away come into focus.

2 **Aperture:** The iris adjustment controls how much light is able to pass through the lens. A more closed aperture will result in a sharper image, but the image will also be darker.

3 **Zoom:** Adjusts the zoom of the lens; wide or telephoto.

3

INSTALLING THE NETWORK CARD

The ethernet card is needed to run our PoE cameras. One card can run up to two cameras. Please make sure that your computer has an available PCI Express slot for this card.

To install the dual port network card, please watch the video tutorial below (clicking the image will open the video link).

Please note: It's important the network card is configured per recommendations.

DRIVER INSTALLATION

Visit www.swingcatalyst.com/downloads, select "see all drivers" and download the driver for "Blackfly S & Spinnaker compatible cameras". Once downloaded, click on the executable and follow the setup wizard.

// Choose "Camera Evaluation".
// Leave "I will use GigE Cameras" box checked.
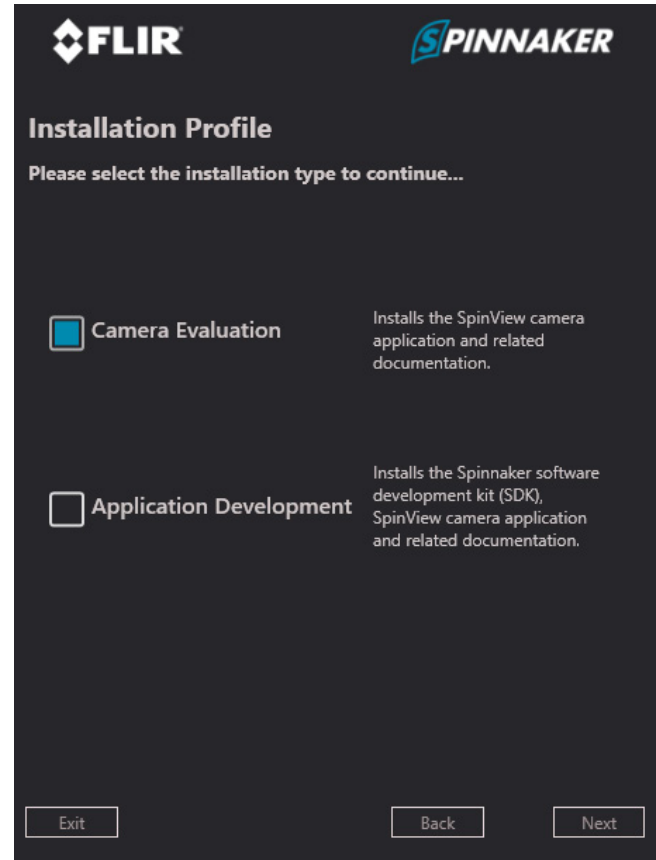
IP CONFIGURATION

After driver installation you should be prompted to run AdapterConfigGUI. If not it can be located in:

C:\Program Files\FLIR Systems\ Spinnaker\shortcuts\utilities

// Click "Start" and select any "Intel(R) 82574L" adapters.

// Click on "Smart Config" and the utility will do the rest.

CONFIGURING THE CAMERA

Make sure the camera is connected to your computer and that the LED in the back of the camera is blinking green.

// Start Swing Catalyst and click Settings, and Cameras.

// Select your camera from the list, and click Advanced.

The Advanced Camera Settings window exposes many settings which you might find handy.

Note that most of the settings are set to auto. We can change these settings to get better control over the image quality for video analysis.

We will take a look at each setting in the next pages.
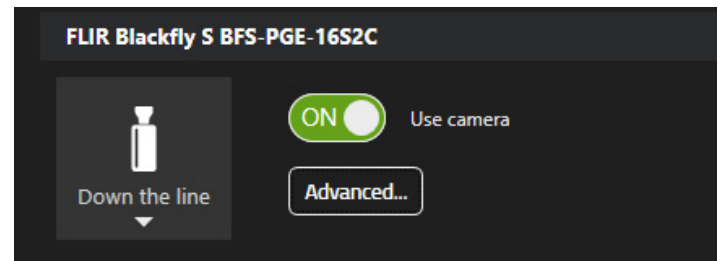
ADVANCED CAMERA SETTINGS
Changing the frame rate

Frame rate indicates how many frames the camera is capable of recording per second.

Checking the Frame rate control enable box will allow you to manually set the frame rate, if this box is unchecked the frame rate is essentially set to auto (note: the maximum frame rate of this camera is 291 FPS. To achieve the maximum frame rate all of the settings need to be set to manual).

Frame rate can be limited by the shutter speed and the device link throughput settings. In this case in order to achieve the full frame rate we need to increase the throughput (more on that later).

Frame Rate

Frame rate control enable ✓

Frame rate   291.00
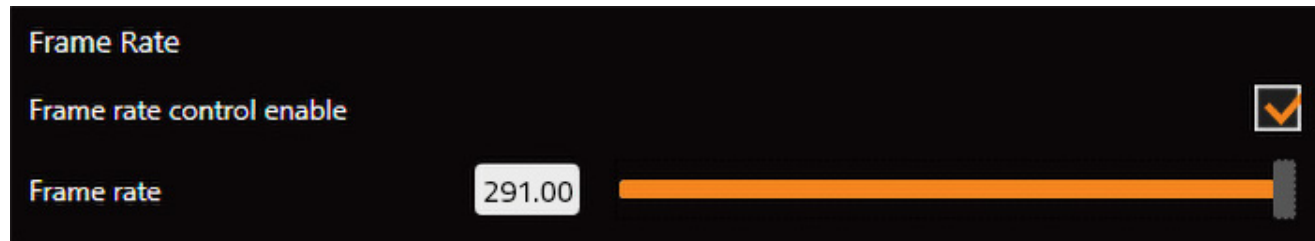
ADVANCED CAMERA SETTINGS
Changing the shutter speed

Shutter speed is the duration of time which the camera shutter is open, which affects the amount of light the camera sensor is exposed to and the time it takes to

Unless we're outdoors in sunlight it's better to use a manual shutter speed, otherwise it's likely the video will be too blurry for sports analysis. To reduce blur we recommend a shutter speed less than 2ms (2000µs), with adequate lighting the shutter speed can be less than 1ms (1000µs).

How bright the video image will be is a combination of the shutter speed, gain settings, lens aperture and how much light is available.
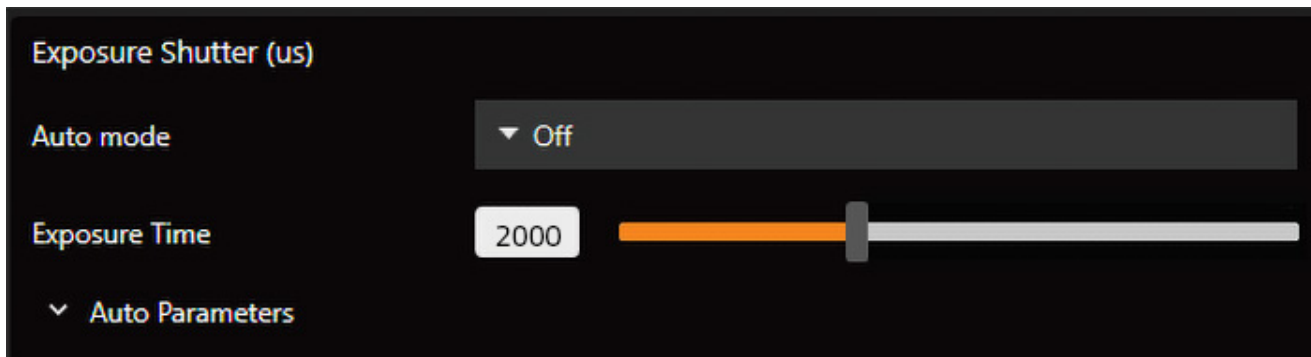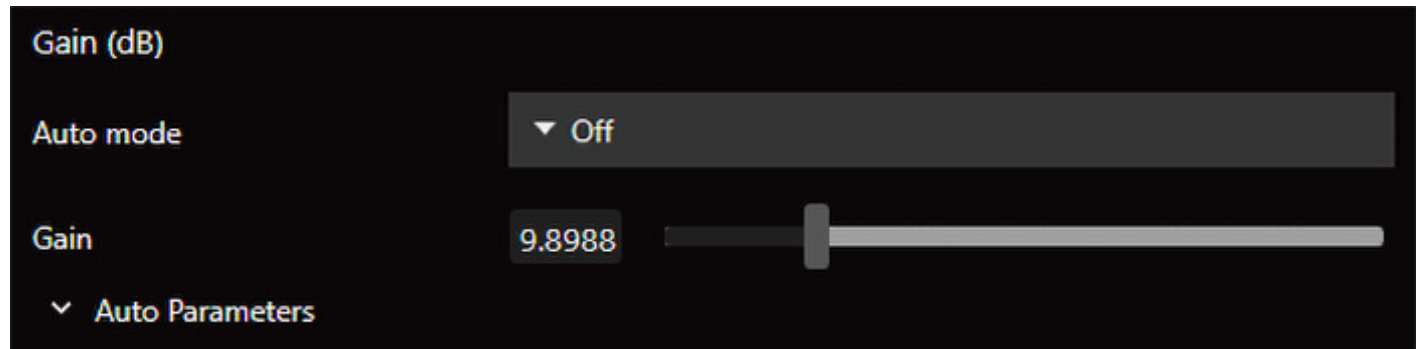
ADVANCED CAMERA SETTINGS
Changing camera gain

Gain is an electronic amplification of the video signal.

The higher the dB value, the brighter the image, however there will also be more noise as a result which may make the overall video quality seem poor. Sometimes it is worth having a slightly higher gain at the expense of noise in order to bring the shutter speed down to get sharp frame by frame video of an object (e.g club at impact, baseball bat etc).

Having gain set to auto is preferable in changing light conditions, but if you have an indoors environment setting gain to manual is the better way to go.

ADVANCED CAMERA SETTINGS
Changing gamma and black levels

Black level can be considered a form of brightness adjustment, where the black level corresponds to the minimum value that any pixel on the camera sensor will return. By increasing the black level value we can make the image brighter.

Our recommendation is to leave this at the default values.

For more details on improving your video image please see this support article which has comparison photos.

ADVANCED CAMERA SETTINGS
Changing the camera's white balance

White balance will affect the color temperature of the video image. The wrong white balance can cause the colours of the image to look strange, often appearing too red or too green.

Normally we recommend to leave this setting to auto (continuous) but in order to achieve the maximum frame rate this needs to be turned off. By enabling auto white balance we sacrifice some frame rate, so we will not be able to use the camera maximum of 291 FPS.
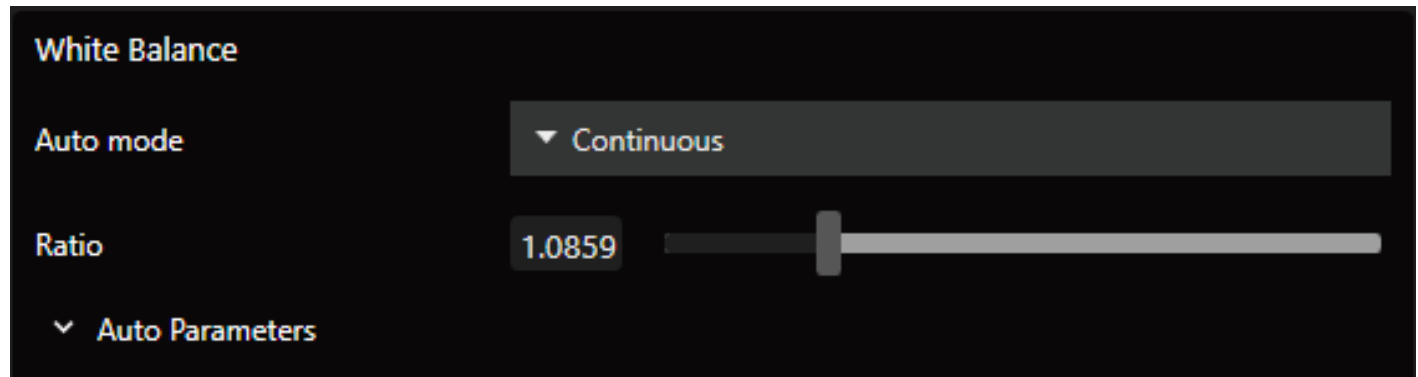
ADVANCED CAMERA SETTINGS
Device link throughput

On GigE cameras, device link throughput and packet size are connected to each other in the sense that in order to use the largest throughput the packet size **needs to be set to 9000.** In order to achieve the full frame rate this must be done.
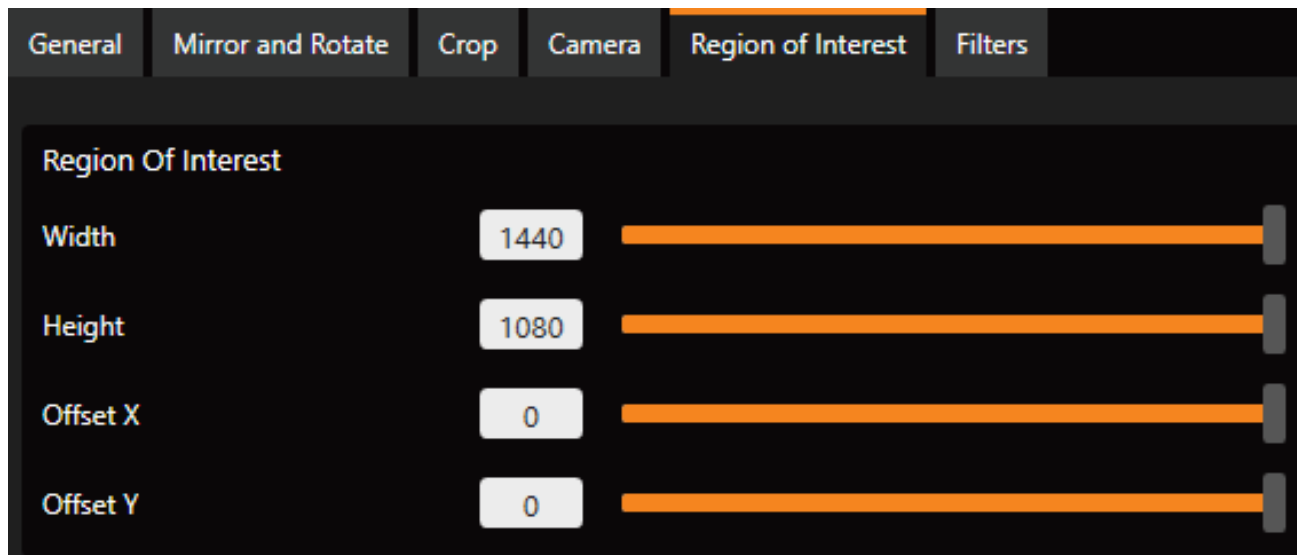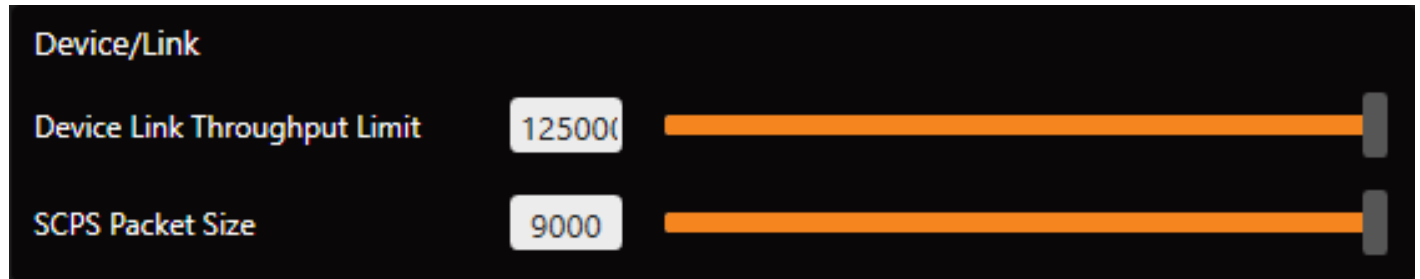
ADVANCED CAMERA SETTINGS
Applying Region Of Interest (ROI)

Region of Interest is a way to reduce the image size and by extension also the bandwidth required for each image. By reducing the image size we can increase the frame rate as the overall pixel readout requirement is smaller.

Reducing the height and width can have a positive effect on frame rate and lowering the bandwidth requirements.
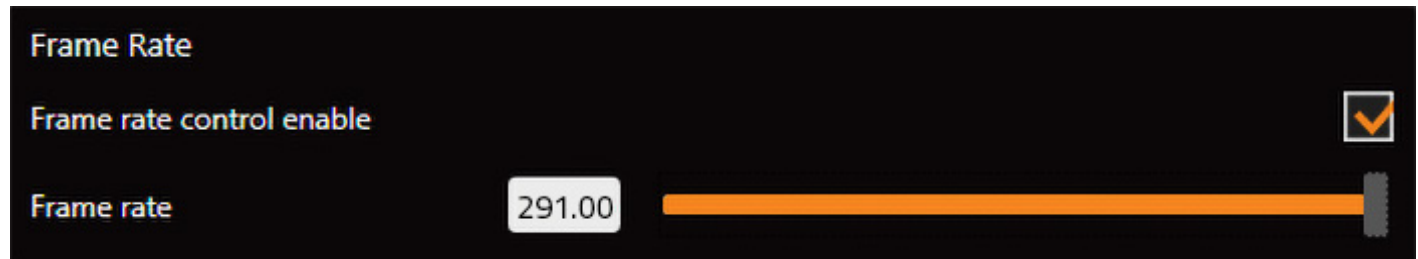
ADVANCED CAMERA SETTINGS
Applying Region Of Interest (ROI) cont.

To change the region of interest we can drag the height slider to the left to reduce the height of the image.

Since we've changed the height of the image, we can also now change the Y offset which can be helpful as an alternative to physically moving the camera due to the reduced image size.

If we go back to the Camera tab and look under frame rate, we now see the maximum frame rate can be set increased, this is because we applied a region of interest by reducing the height of the camera sensor).
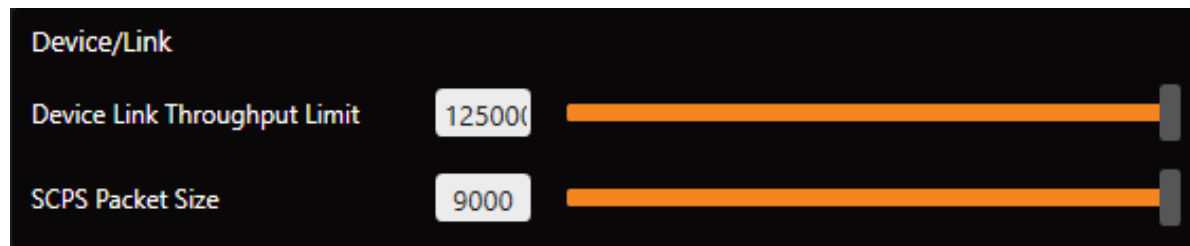
TROUBLESHOOTING

Please see our GigE Vision/Gigabit Ethernet recommendations.

Dropped frames:

Although most GigE cameras are very reliable, depending on the network setup and camera setup it may be necessary to tweak the settings to avoid dropped frames. Make sure the packet size is set to 9000 - this is crucial for good performance. It's also important that the network adapter is setup to use 9kB jumbo frames so both the camera & network adapter match.

One GigE camera at 291 FPS will use roughly 113 MB/s per camera. It is therefore important to have a dedicated network controller card per our recommendations for multiple camera setups (in most cases). If you've purchased a GigE camera through us you will have a PCI Express dual port network card to install.

TROUBLESHOOTING PT. 2

Region Of Interest (ROI):

Using a region of interest will reduce the overall image size and boost the FPS, but also it can help lower the bandwidth usage which in turn could reduce dropped frames (please refer to pages 14 and 15 on how to use ROI).

Other problems:

Depending on your hardware it might not be the best to have the sharpening and denoise filters on, turning these off will reduce some CPU & GPU usage. You can find the camera filters in the Advanced Camera Settings Filters tab. You can find more information about filters here.

If you are experiencing any other issues, please visit our Support Center

swingcatalyst

contact@swingcatalyst.com

www.swingcatalyst.com