DEWETRON

# OXYGEN TRAINING
# > VIDEO SUPPORT

# CONTENT

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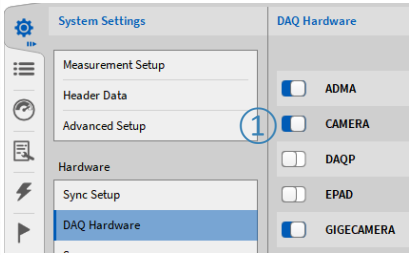
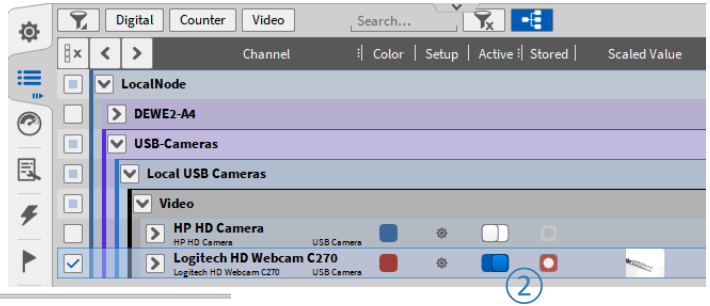
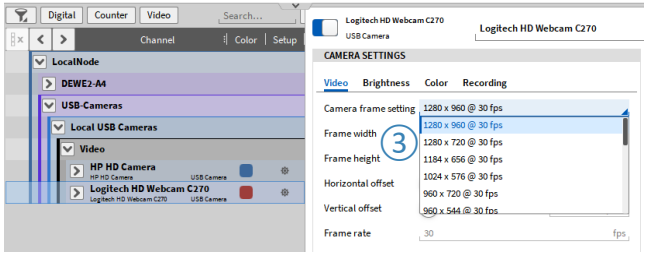
# WEBCAM SETUP

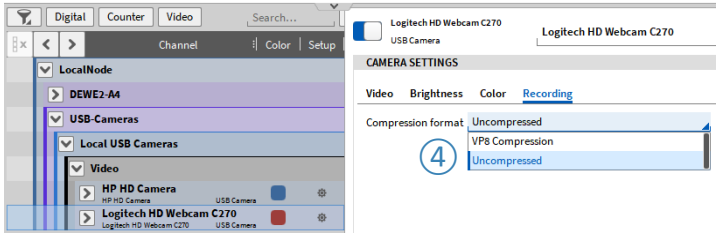
| | |
|---|---|
| | Connect the webcam to the PC and (re)start OXYGEN |
| ① | Enable *CAMERA* in *DAQ Hardware* menu and restart OXYGEN if not already activated |
| ② | Go to the Channel List and enable the camera for DAQ and Recording |
| ③ | The resolution could be adjusted in the Camera Settings |
| ④ | The data could be stored to mkv-format (compressed) or dmv-format (uncompressed) |

*Please note that the video data will not be stored into the OXYGEN dmd-file but in a separate video data file (*.mkv or *.dmv)*

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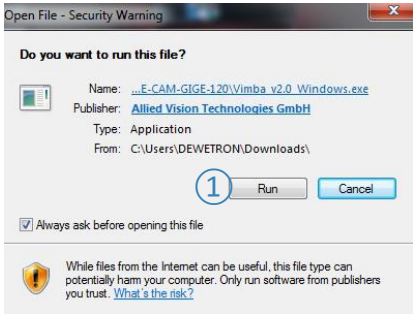
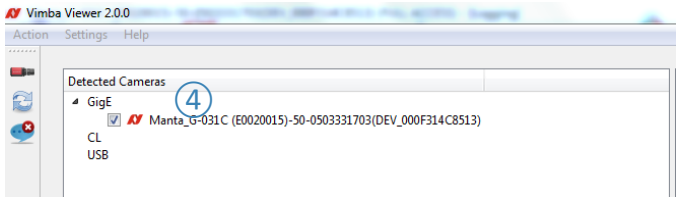
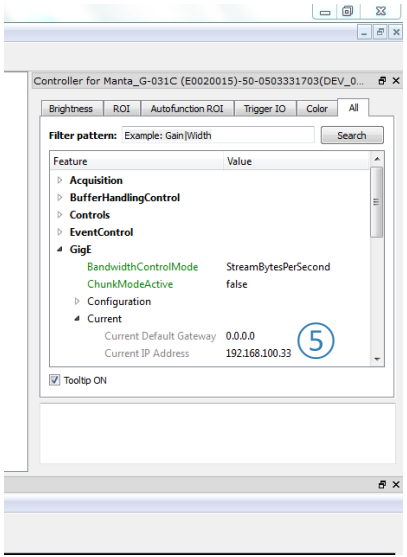
# GIGE CAMERA SETUP - INSTALLATION

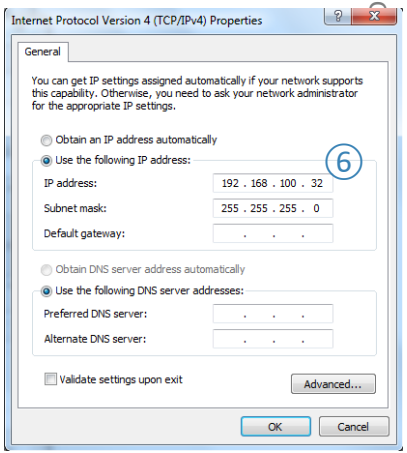
| | |
|---|---|
| | Connect the GIGE camera to the PC |
| ① | To install the drivers, execute the file *Vimba_v2.0_Windows.exe* and confirm the execution |
| ② | Select the *Vimba Applications* and press *Start* |
| ③ | After installation is finished, press *Exit* |
| | A system restart is recommended |
| ④ | Open the *Vimba Viewer*. The connected camera will show up in the *Detected Cameras* section |
| ⑤ | Check the camera's IP address which can be found in *All > GigE > Current > Current IP Address* |
| ⑥ | Set the IP address of the network port the camera is connected to a static IP address within the same subnet range *192.168.100.xxx* |





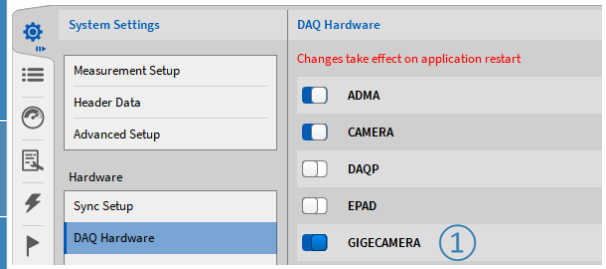



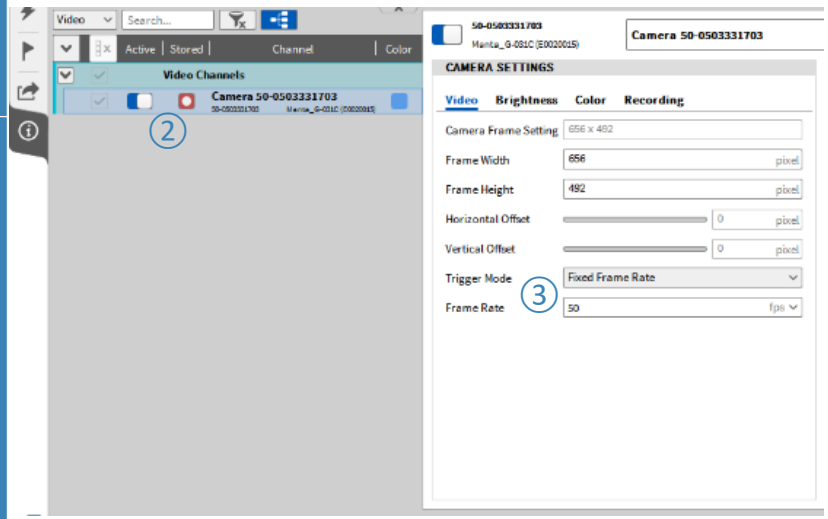



# GIGE CAMERA SETUP - OXYGEN

| | |
|---|---|
| ① | Enable *GIGECAMERA* in DAQ Hardware menu and restart OXYGEN if not already activated |
| ② | Go to the *Video* section and enable the camera |
| ③ | If the camera shall be used in freerun mode (frame update not triggered by OXYGEN), select *Fixed Frame Rate* and select the desired *Frame Rate* below |

*If multiple cameras are activated at the same time, they share the network bandwidth. If the bandwidth is not enough OXYGEN will display a warning and the user needs to limit the frame rate.*



# GIGE CAMERA SETUP - OXYGEN

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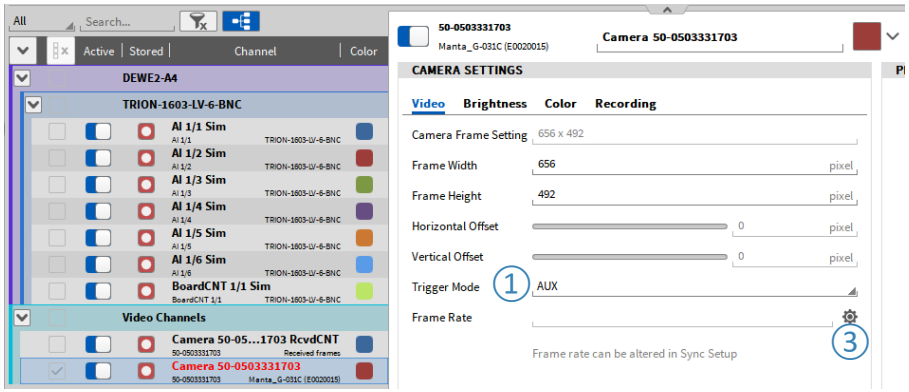
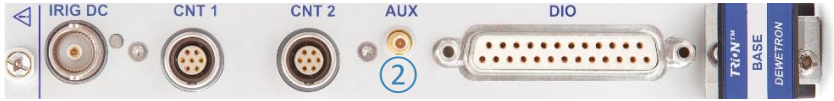
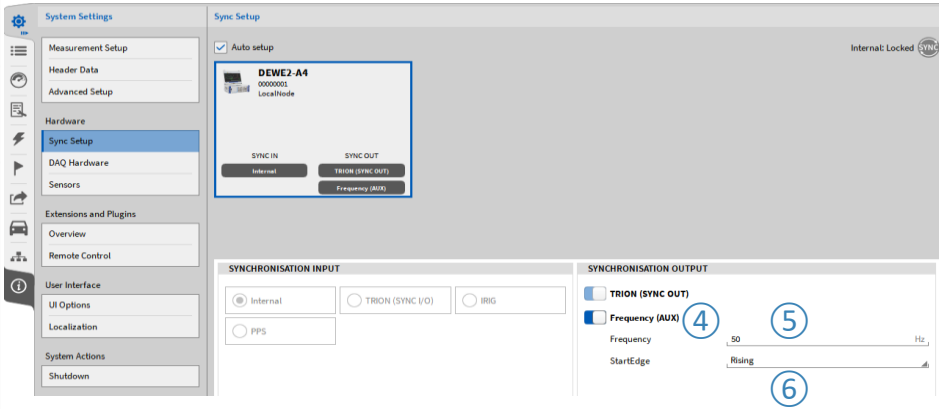
| | |
|---|---|
| ① | If the frame update of the camera shall be triggered by OXYGEN, select AUX |
| ② | For triggering the camera by OXYGEN a TRION-BASE, TRION-TIMING or TRION-VGPS board is required.<br>These boards have an AUX connector which can be configured to provide a LVTL signal for triggering the cameras.<br>Proper cables are typically provided by DEWETRON. |
| ③ | For configuring the *AUX* output, press the Gear button to open the *Sync Setup* |
| ④ | Enable the *Frequency (AUX)* output |
| ⑤ | Select the proper *Frequency* which will equal your camera frame rate |
| ⑥ | Select *StartEdge Rising* which means that the camera frame is update every time the signal has a rising edge.<br><br>Synchronization to falling edges is not supported. |



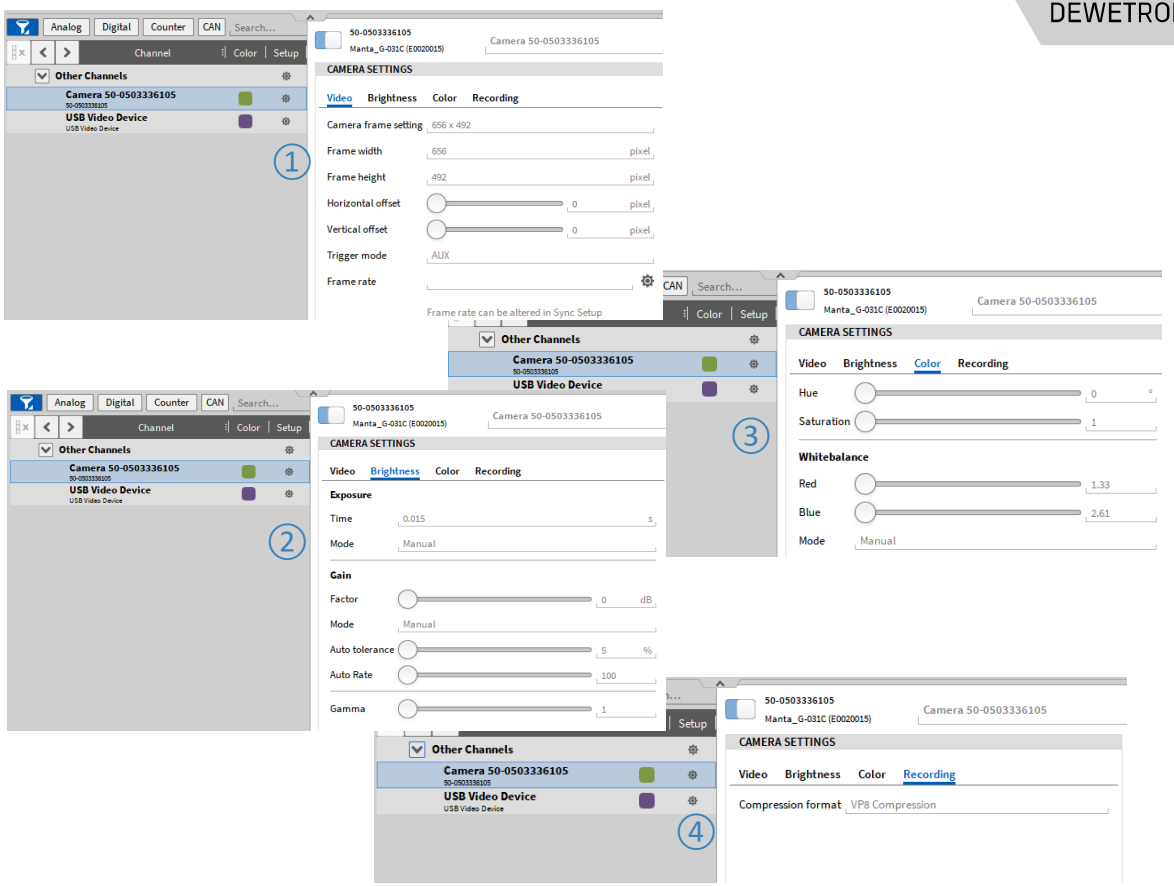



# GIGE CAMERA SETUP – CAMERA SETTINGS

| | |
|---|---|
| ① | The frame size (width and height), Horizontal and vertical offset can be adjusted in the Video section of the Camera settings as well as the Trigger mode. |
| ② | Exposure and Gain settings of the camera can be edited in the Brightness section of the Camera Settings |
| ③ | Color settings can be edited in the Color section of the Camera Settings |
| ④ | The data could be stored to mkv-format (H.264 or VP8 compression) or dmv-format (uncompressed) |

*Please note that the video data will not be stored into the OXYGEN dmd-file but in a separate video data file (*.mkv or *.dmv)*



# ALVIUM CAMERA SETUP - INSTALLATION

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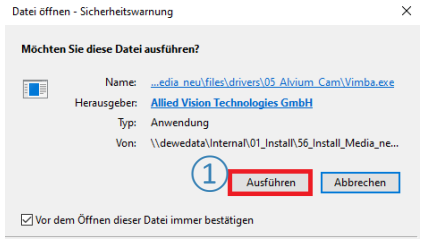
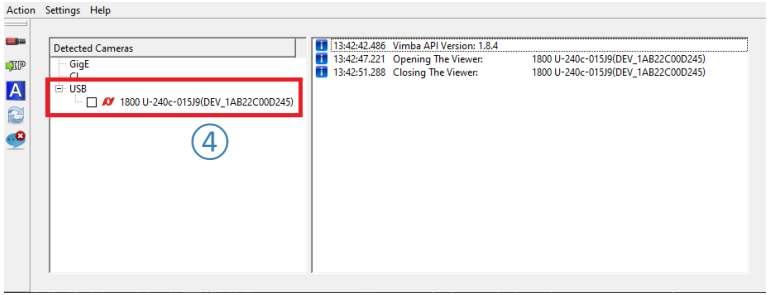
| | |
|---|---|
| | Connect the Alvium camera to the PC |
| ① | To install the drivers, execute the file *Vimba_v5.0_Windows.exe* and confirm the execution |
| ② | Select the *Vimba Applications* and press *Start* |
| ③ | After installation is finished, press *Exit* |
| | A system restart is recommended |
| ④ | Open the *Vimba Viewer*. The connected camera will show up in the *Detected Cameras* section |





# ALVIUM CAMERA SETUP - OXYGEN

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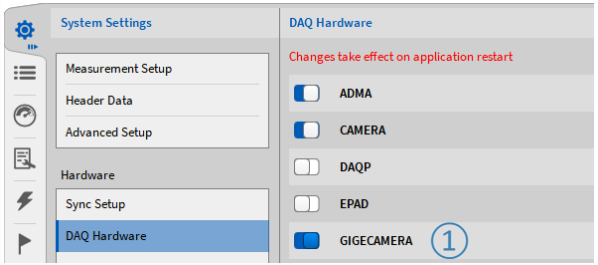
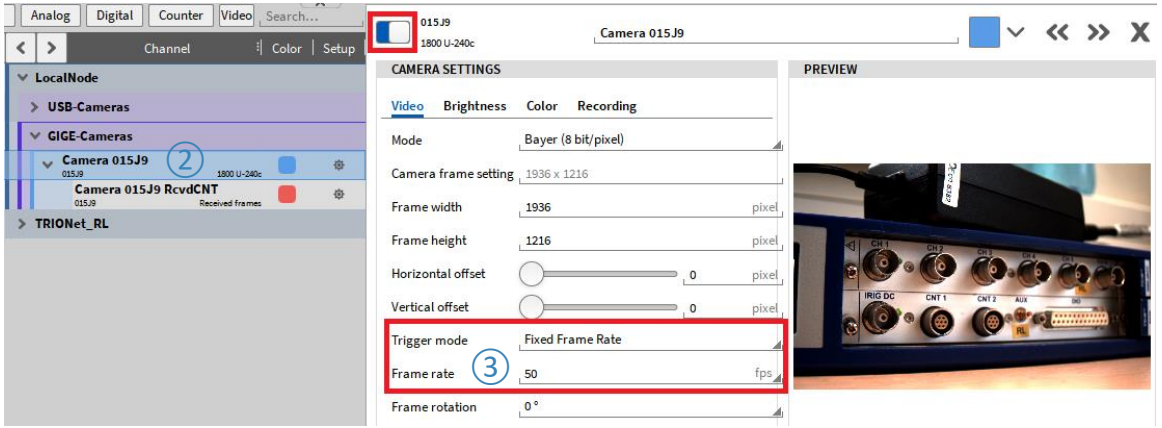
| | |
|---|---|
| ① | Enable *GIGECAMERA* in DAQ Hardware menu and restart OXYGEN if not already activated |
| ② | Go to the *Video* section and enable the camera |
| ③ | If the camera shall be used in freerun mode (frame update not triggered by OXYGEN), select *Fixed Frame Rate* and select the desired *Frame Rate* below |

*If multiple cameras are activated at the same time, they share the network bandwidth. If the bandwidth is not enough OXYGEN will display a warning and the user needs to limit the frame rate.*

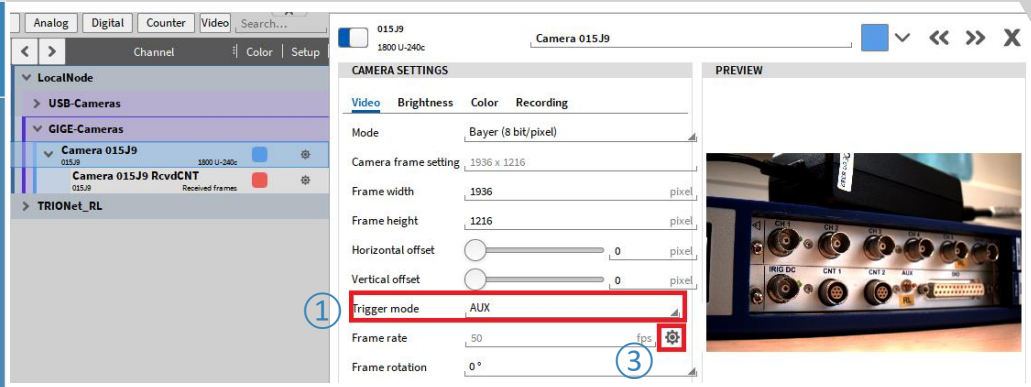


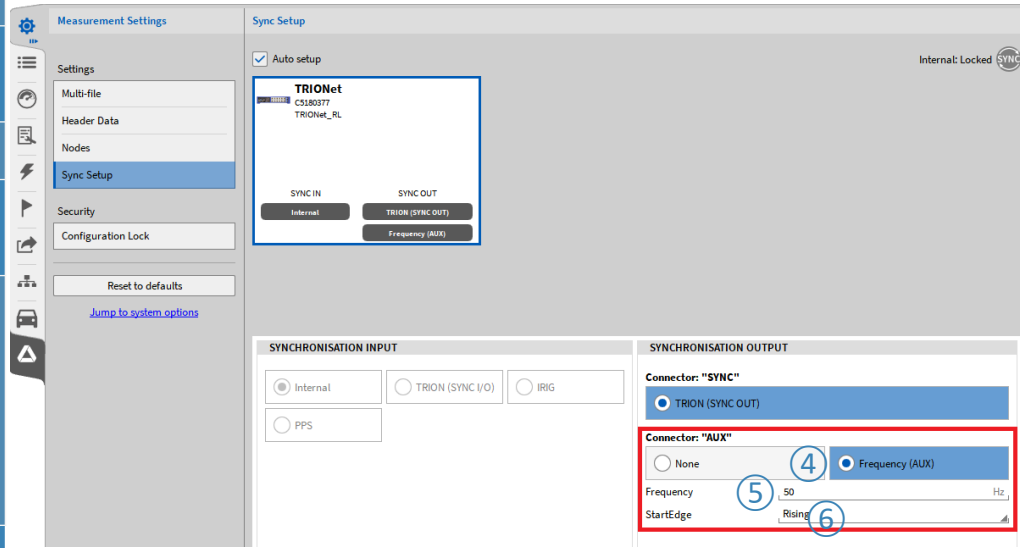



# ALVIUM CAMERA SETUP - OXYGEN

DEWETRON

| | |
|---|---|
| ① | If the frame update of the camera shall be triggered by OXYGEN, select AUX |
| ② | For triggering the camera by OXYGEN a TRION-BASE, TRION-TIMING or TRION-VGPS board is required.<br>These boards have an AUX connector which can be configured to provide a LVTL signal for triggering the cameras.<br>Proper cables are typically provided by DEWETRON. |
| ③ | For configuring the *AUX* output, press the Gear button to open the *Sync Setup* |
| ④ | Enable the *Frequency (AUX)* output |
| ⑤ | Select the proper *Frequency* which will equal your camera frame rate |
| ⑥ | Select *StartEdge Rising* which means that the camera frame is update every time the signal has a rising edge.<br><br>Synchronization to falling edges is not supported. |




# GIGE CAMERA SETUP – CAMERA SETTINGS

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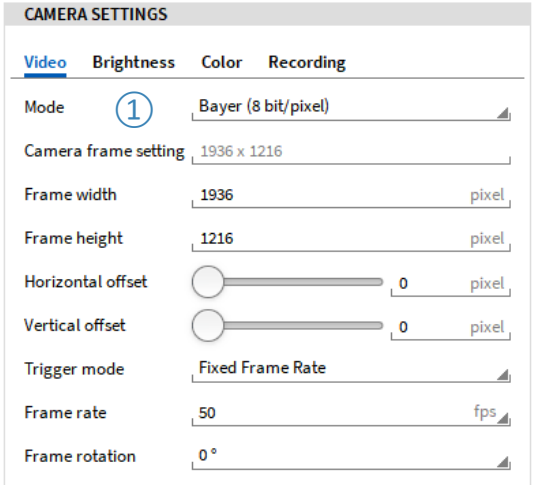
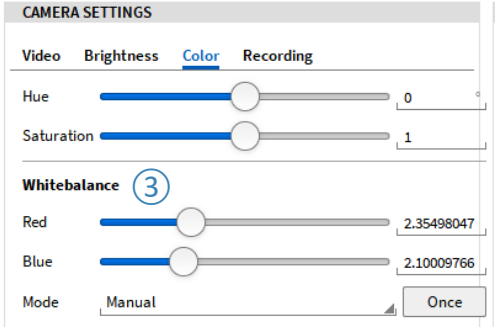
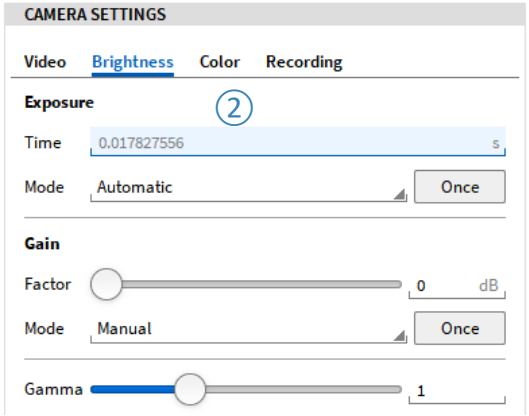
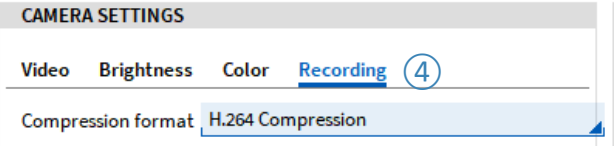
| | |
|---|---|
| ① | The video transmission mode, frame size (width and height), Horizontal and vertical offset can be adjusted in the Video section of the Camera settings as well as the Trigger mode. |
| ② | Exposure and Gain settings of the camera can be edited in the Brightness section of the Camera Settings |
| ③ | Color settings can be edited in the Color section of the Camera Settings |
| ④ | The data could be stored to mkv-format (H.264 or VP8 compression) or dmv-format (uncompressed) |

*Please note that the video data will not be stored into the OXYGEN dmd-file but in a separate video data file (*.mkv or *.dmv)*

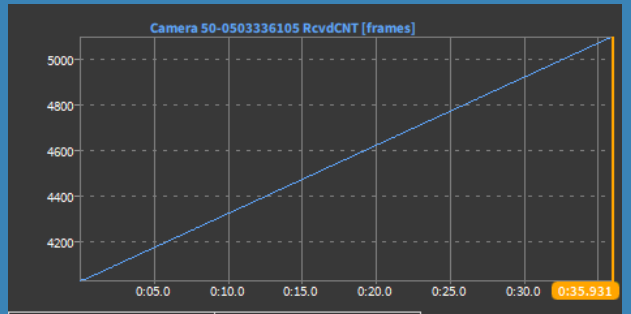


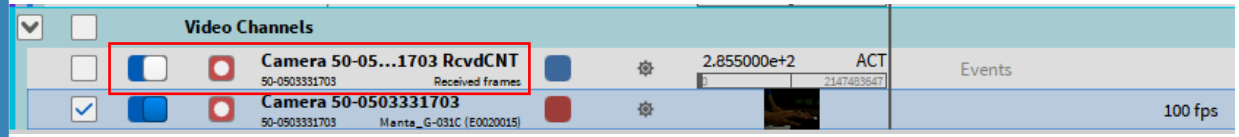



# FRAME COUNTER CHANNEL




| Time | Camera 50-0503336105 RcvdCNT [frames] |
|---|---|
| 0:35.8985212 | 5096 |
| 0:35.8651879 | 5095 |
| 0:35.8318546 | 5094 |
| 0:35.7985212 | 5093 |
| 0:35.7651879 | 5092 |
| 0:35.7318546 | 5091 |
| 0:35.6985212 | 5090 |
| 0:35.6651879 | 5089 |
| 0:35.6318545 | 5088 |
| 0:35.5985212 | 5087 |
| 0:35.5651879 | 5086 |
| 0:35.5318545 | 5085 |
| 0:35.4985212 | 5084 |
| 0:35.4651879 | 5083 |
| 0:35.4318545 | 5082 |
| 0:35.3985212 | 5081 |
| 0:35.3651878 | 5080 |
| 0:35.3318545 | 5079 |
| 0:35.2985212 | 5078 |
| 0:35.2651878 | 5077 |




For each camera there exists a counter channel that counts the number of received frames since acquisition start. The channel has the same name as the respective camera with *RcvdCNT* appended. In order to activate the counter, you need to activate the channel (the channel is not activated automatically).

This channel increases by one every time a new frame is received by OXYGEN from the camera. The instant of time when the frame is updated is stored as well and can be displayed in a table instrument or if the frame counter is visualized in a Recorder.

Thus, the information when the camera frame is updated, is available in this channel. In case the camera is running with a fixed frame rate, the instant of time the frame is updated is determined by the camera itself.

In case, the camera is running in AUX mode and is triggered by OXYGEN, the instant of time the frame is updated is determined by OXYGEN.

# WEBCAM VS GIGE CAMERA

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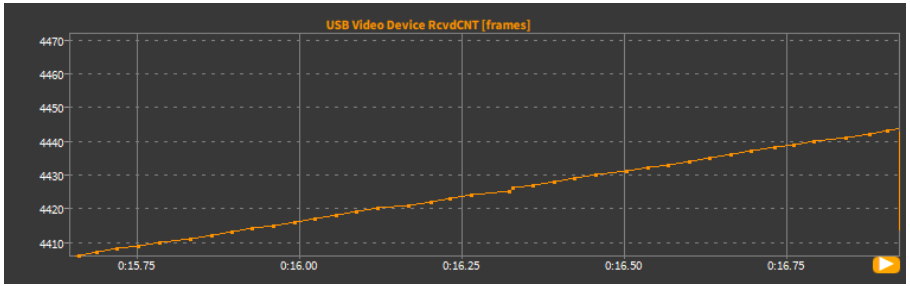
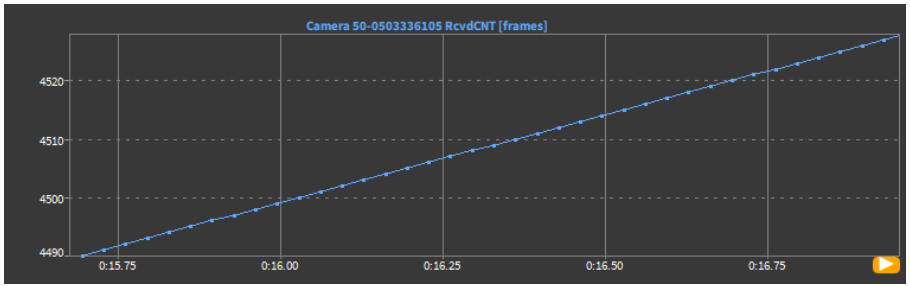
Webcam:
> Data transmission over USB
> Fixed frame rate, not editable by the user
> Stochastic frame update
> Only free run mode

GigE camera:
> Data transmission over LAN
> Frame rate editable by the user
> Deterministic frame update
> Possibility to trigger frame update by OXYGEN

## Webcam frame update:




## GIGE camera frame update:



# EXTERNAL VIDEO SYNC – SYNC OPTIONS

*Since OXYGEN R5.5 it is possible to load and synchronize external video files into an OXYGEN data file (dmd-file). This might be required when video is captured in parallel to the data recording with a 3rd party video capturing software of a camera that is not natively supported in OXYGEN.*

*Supported Formats:*
- *AVI (uncompressed)*
- *MKV (VP8 and h264)*
- *MP4 (h264)*


Description:

An external signal / device is used to trigger the recording start of DAQ system and camera. The signal is normally a TTL signal with a rising edge to initiate the recording start.
Modern highspeed cameras provide trigger signal input. The DAQ system requires a digital signal input to acquire the signal and trigger the recording state. Analog inputs could be used as well.

Advantage:
- Parallel recording start of camera and DAQ system without any latencies
- Easy synchronization of sensor data and video data
- No manual recording start on any device required

Disadvantage:
- Separate hardware required for generating the trigger signal

# EXTERNAL VIDEO SYNC – SYNC OPTIONS CONT'D


Description:

The camera generates a TTL signal with rising edge at recording start which is forwarded to the DAQ system via the Trigger output of the camera. Modern highspeed cameras provide a trigger signal for triggering the recording state of 3rd party hardware. The DAQ system requires a digital signal input for acquiring the signal and triggering the recording state. Analog inputs could be used as well.

Advantage:

- Parallel recording start of camera and DAQ system without any latencies
- Easy synchronization of sensor data and video data
- No separate hardware required for generating the trigger signal

Disadvantage:

- Recording must be started manually for the camera

# EXTERNAL VIDEO SYNC – SYNC OPTIONS CONT'D


Description:

The DAQ system generates a TTL signal with Rising edge at recording start which is forwarded to the camera via a digital output of the DAQ system. Modern highspeed cameras provide a trigger signal input.
The operating system of the DAQ system will cause a delay between the DAQ system's recording start and the instant of time the digital output is physically set to high which results in the recording start of the camera. This delay can be measured by recording the Digital Out channel. In real-life, a delay in the msec-range between DAQ system recording start and camera recording start will occur which can be compensated while loading the video into OXYGEN for post processing.

Advantage:

- No separate hardware required for generating the trigger signal
- Recording start of the DAQ system could be triggered

Disadvantage:

- Deterministic latency between recording start of camera and DAQ system caused by the operating system
- Latency needs to be compensated while loading and post processing the video

# EXTERNAL VIDEO SYNC – SYNC OPTIONS CONT'D

*Manual Rec Start*


*Manual Rec Start*

Description:

Recording is started manually both on the DAQ system and the camera.

Advantage:

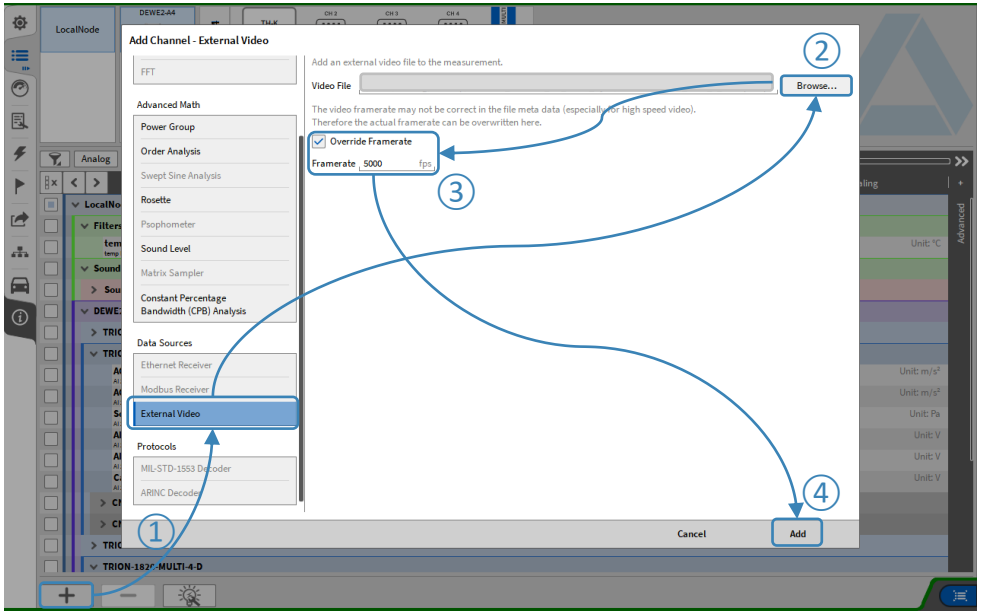
- No separate hardware required for generating the trigger signal
- No wiring between camera and DAQ system required

Disadvantage:

- Stochastic latency between recording start of camera and DAQ system caused by the operating system
- Latency needs to be determined empirically and compensated while loading and post processing the video

# EXTERNAL VIDEO SYNC – VIDEO SELECTION

| | |
|---|---|
| ① | To load an external video, go to the Channel List, press the *+* Button and select *External Video* |
| ② | Click on *Browse…* to select the video file |
| ③ | Enter the native recording frame rate of the video |
| ④ | Press *Add* to create a new video channel |




*Supported Formats:*

- *AVI (uncompressed)*
- *MKV (VP8 and h264)*
- *MP4 (h264)*

# EXTERNAL VIDEO SYNC – SYNCHRONIZATION

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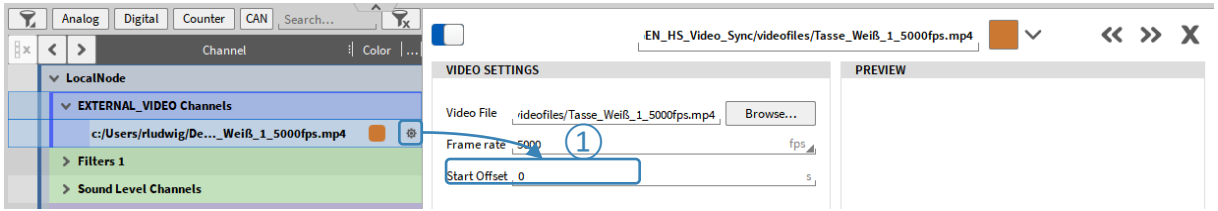
① If the time difference of the recording start between the OXYGEN data file and the video data file is known, it can be entered in *Start Offset* available in the video's channel setup.

*Positive offset denotes that OXYGEN data recording was started first and video data recording second.*

*Negative offset denotes that video data recording was started first and OXYGEN data recording second.*

*As the recording start of the OXYGEN data file and the video data file is most likely not the same, the timeline of the video data needs to be aligned to the OXYGEN data file.*



# EXTERNAL VIDEO SYNC – SYNCHRONIZATION CONT'D

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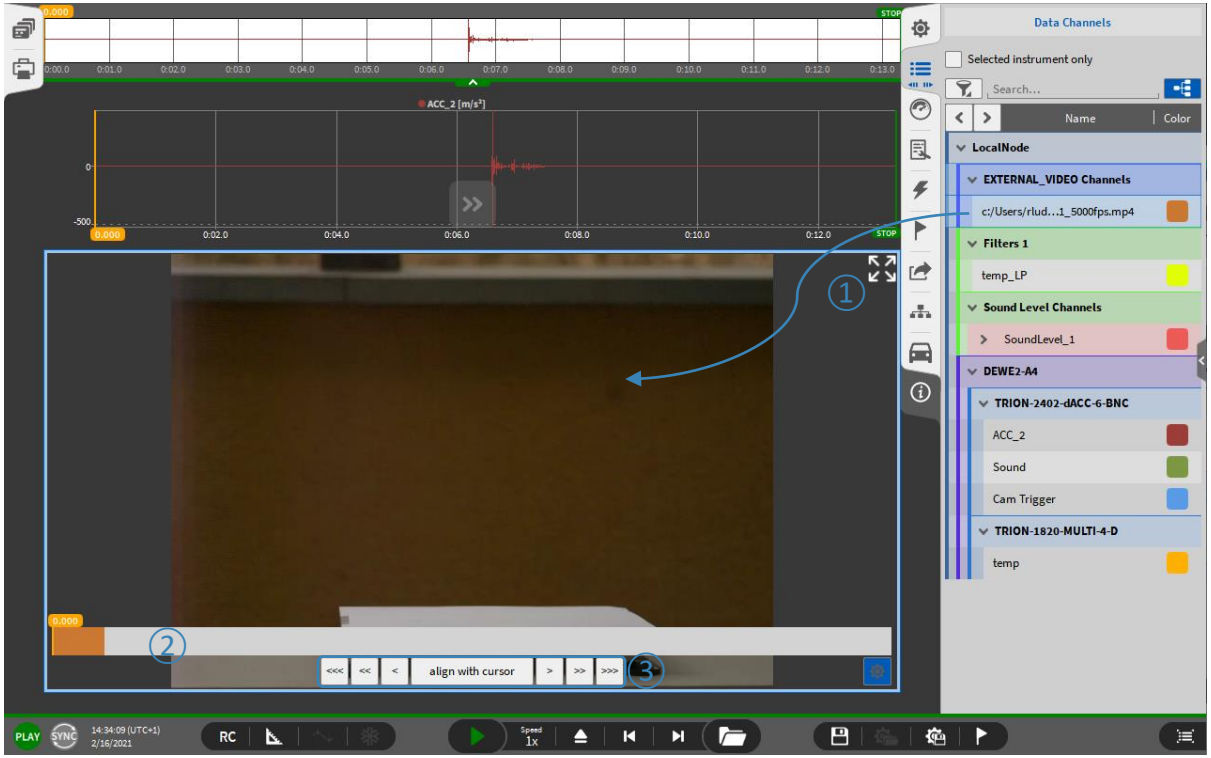
| | |
|---|---|
| ① | If the time difference of the recording start between the OXYGEN data file and the video data file is not known, the timeline can be aligned manually.<br><br>Go to the measurement screen and drop the external video channel to the measurement screen. This will create a video instrument including the video |
| ② | The timebar shows the actual position of the video within the OXYGEN data file |
| ③ | The buttons<br>*<<<, <<, < align with cursor, >>>, >>, >* can be used to change the position of the video within the data file<br><<< Move the video +1 frame<br><< Move the video +100 frames<br>< Move the video +100 frames<br>*Align with cursor*: Move video start to actual cursor position<br>> Move the video -1 frame<br>>> Move the video -10 frames<br>>>> Move the video -100 frames |



# EXTERNAL VIDEO SYNC – SYNCHRONIZATION CONT'D

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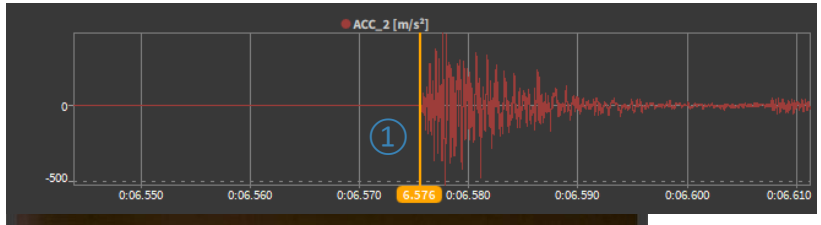
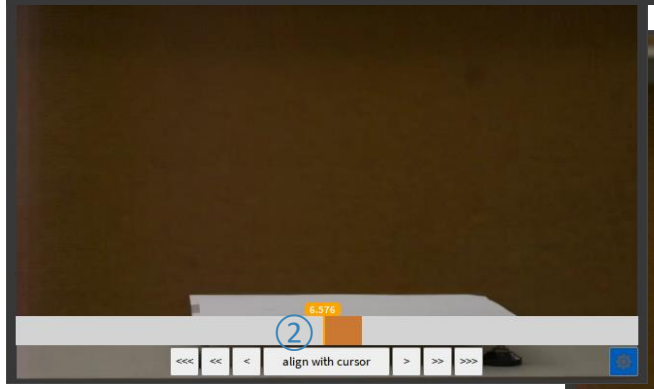
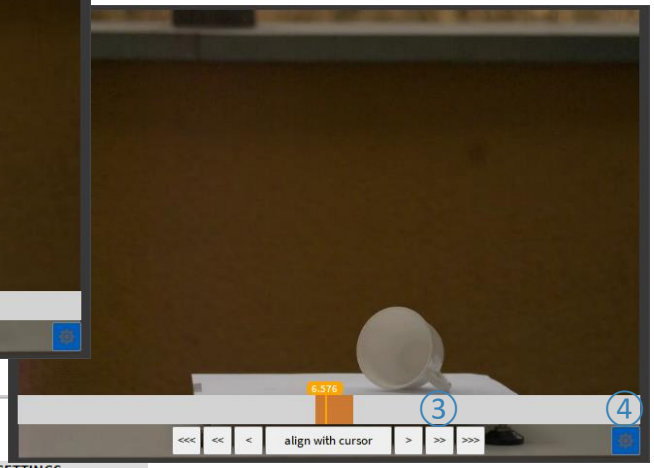
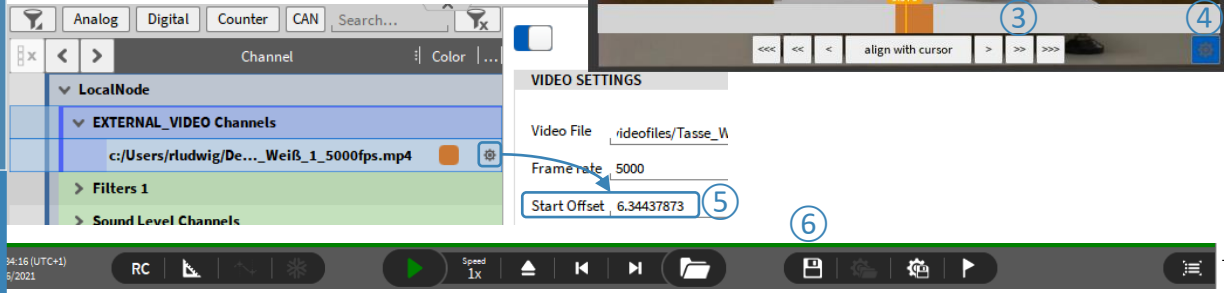
| | |
|---|---|
| ① | Use the Recorder to move the orange cursor to the reference event for data synchronization |
| ② | Press *align with cursor* to move the video start to the orange cursor position for a rough time adjustment |
| ③ | For fine time adjustments, use the <<<,<<,< & >,>>,>>> buttons to align the time line |
| ④ | When finished, the timebar can be hidden |
| ⑤ | The absolute time offset can also be seen in the video's channel setup |
| ⑥ | The settings can be saved to the data file<br><br>*Please note that only the file path to the video is stored to the OXYGEN data file but not the video itself* |



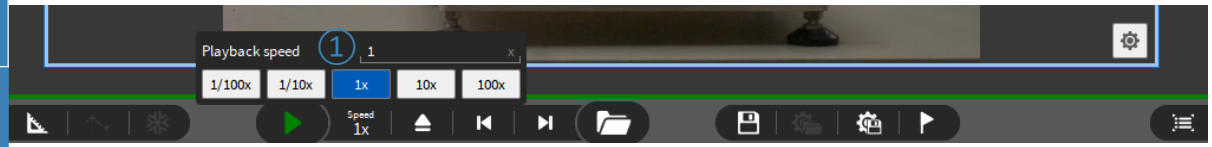



# PLAYBACK SPEED ADJUSTMENT

DEWETRON

① For detailed analysis of correlation between video and measurement data, the data playback speed can be adjusted




> *Pre-Selection from 100x to 1/100x is available*

> *Individual playback speed is available as well*

> *Please be aware that Audio Replay is not working in case the playback speed is not 1x*

# SAVE MEASUREMENT SCREEN TO VIDEO

| | |
|---|---|
| ① | Expand the Screens menu to the full screen to enter the *Save screen as video* menu |
| ② | Select the desired measurement screen for exporting |
| ③ | It is possible to export either the entire measurement or only the time region of a selected recorder |
| ④ | The playback speed for the exported video file can be within 0.1 … to 100 % |
| ⑤ | A relative , absolute or no timestamp can be displayed in the upper right corner of the exported video |
| ⑥ | Select the export video resolution |
| ⑦ | Select the export video frame rate from 10 … 100 fps |
| ⑧ | Select dark or light screen background for the export video |
| ⑨ | Generate the video and select the export path |