



***Motion Inspector,
Motion Viewer, Motion Pad***
Cross-platform User Manual
for Windows™, MACOS X™ and iOS™

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1. Terms and Conditions

For more detailed information, see the “**EULA**” document.

2. System Overview

2.1. Supported platforms

Motion Inspector and Motion Pad support the following platforms:

- Microsoft Windows 7, 8, 8.1 and 10 (64 bits).
- Apple MAC OS/X 10.10 (Yosemite) and newer.
- Apple iOS version 8.0 and later.

The cross-platform manual provides instructions on using Motion Inspector on the above platforms. The icons below denote differences in setup, procedures and commands between Windows, OS/X and iOS users.



2.2. Supported cameras

The table below shows the minimum firmware requirements for operating a camera with Motion Inspector and Motion Pad.

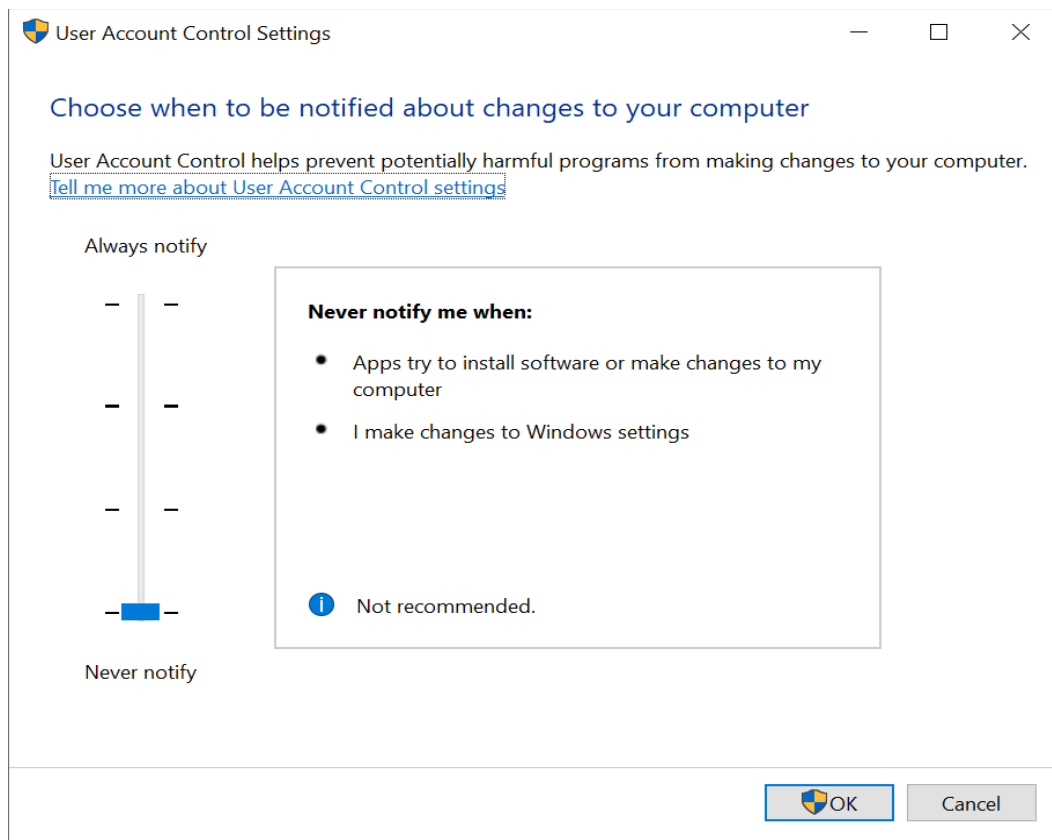
Camera Model	Min Firmware version (Motion Inspector)	Min Firmware version (Motion Pad)
Y3-Classic	109.89	None
Y3-S1/S2	Any version	None
Y4	125.102	None
Y5	125.102	None
Y6	142.120	None
Y7, Y8	Any version	None
N/NR 3-S1/S2	150.112	150.112
N/NR 3-S3/S4	Any version	Any version
N/NR 4	150.112	150.112
N/NR 5	153.116	153.116
NR 7/8	Any version	Any version
Nx, NxT, NX-Air, iN	Any version	Any version
OS/OS-II	Any version	Any version
CrashCam	Any version	Any version
CC-mini/CC-Stick	Any version	Any version
X-Stream PCIe	Any version	None
XS-Mini/XS-Stick/XS-II	Any version	None

NOTE: X-series, HG-series and M-series are NOT supported by Motion Inspector or Motion Pad.

2.3. How to disable the User Account Control on Windows (UAC)

To disable the User Account Control on Windows, follow the instructions below.

1. Open the “Control panel” and select the “User Accounts” option.
2. Enter the page that manages you account.
3. Click the “Change User Account Control” option.
4. Move the slider to the bottom (like in the picture below) to the “never notify” position.
5. Click OK and restart Windows.



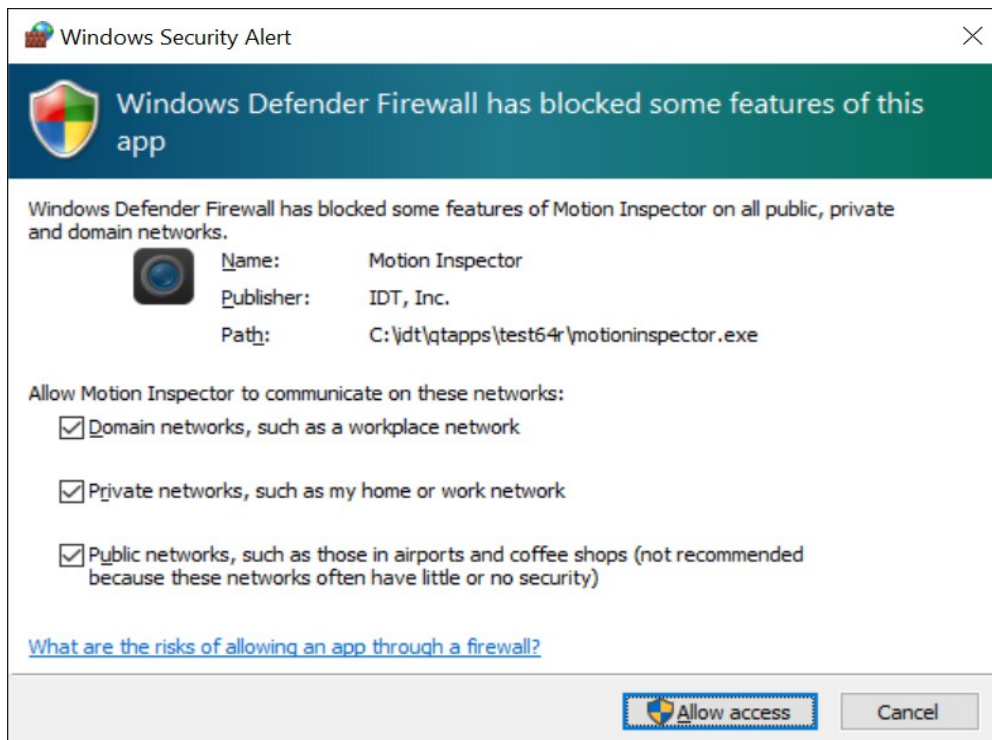
2.4. How to configure the Windows Firewall

All the cameras that support gigabit Ethernet communication may have issues if the Windows Firewall is installed. They communicate through the UDP network protocol and need to open listening ports to receive the images.

In most of the cases, the windows firewall shouldn't be disabled, Motion Inspector should be added to the list of the allowed programs and some other parameters should be configured in the firewall.

2.4.1. How to add Motion Inspector to the list of allowed programs.

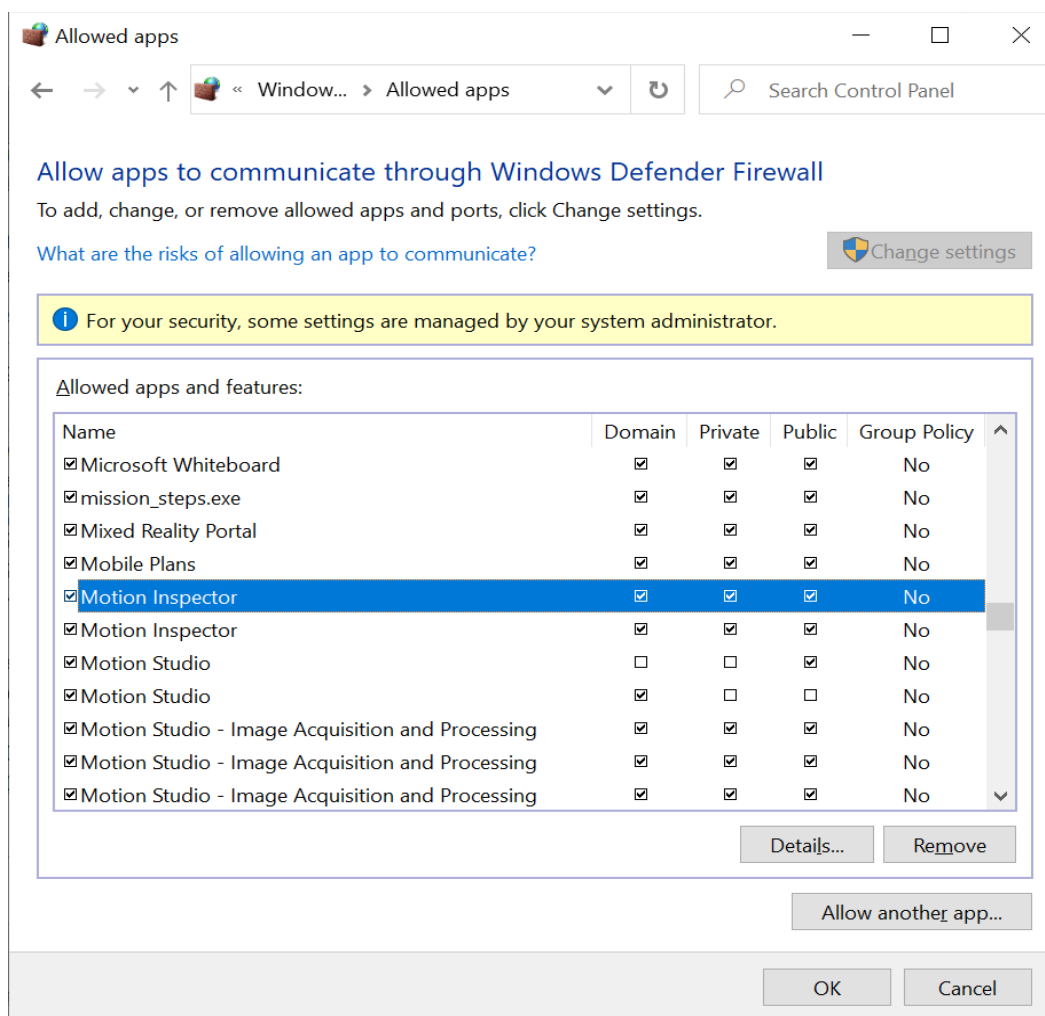
When an Ethernet camera is operated for the first time, the Windows firewall detects the attempt to communicate through the network and tries to block it. The message below appears



The software will be allowed to communicate through the network if both the private and public options are selected. Then click the “Allow access” button.

If the User Account Control (UAC) is disabled or you don't check both the options, you may still allow the communication through the firewall.

- From the control panel, start the Windows Firewall and select “Allow a program or feature through Windows Firewall”.
- Scroll the list and make sure that “Motion Inspector” is in and all the check boxes are selected (see below).

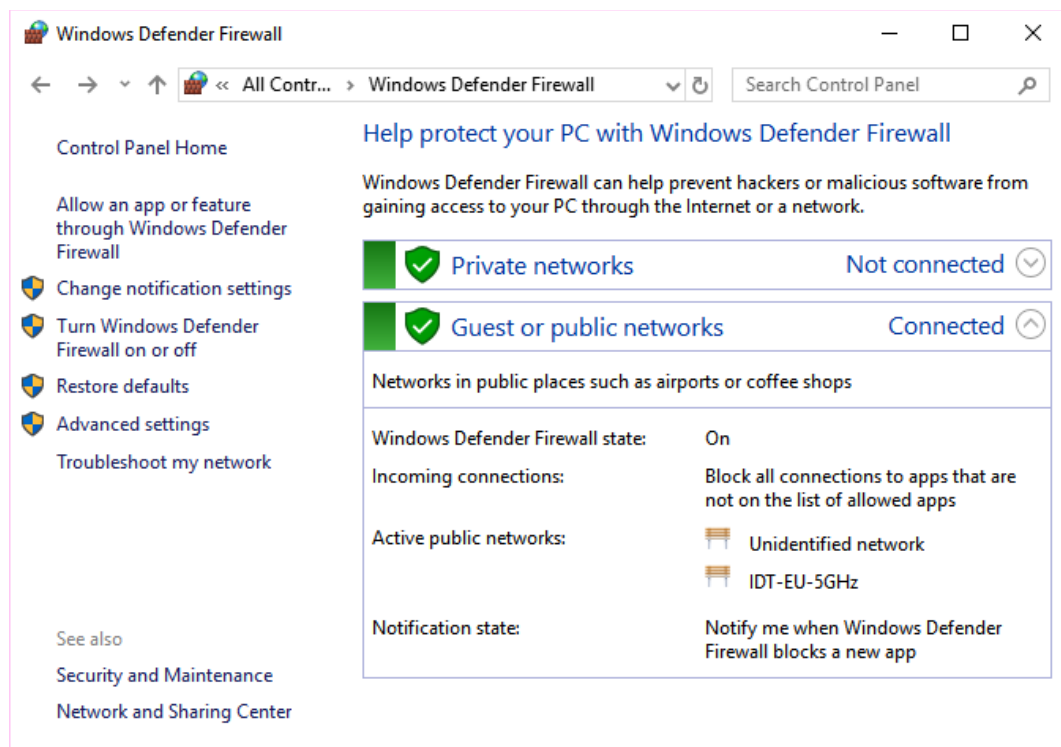


2.4.2. How to disable the Windows firewall

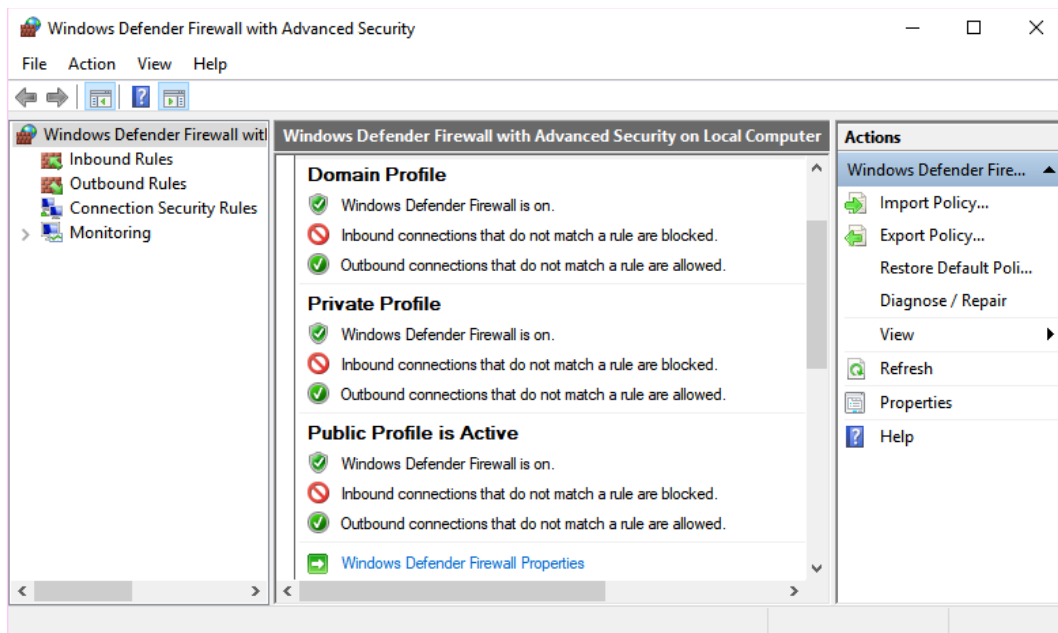
To disable the Windows firewall the user needs Administrative privileges. The firewall separately manages three profiles and it should be disabled on all of them:

- Domain profile.
- Private Profile.
- Public Profile.

From the Control Panel, open the Windows Firewall dialog box.

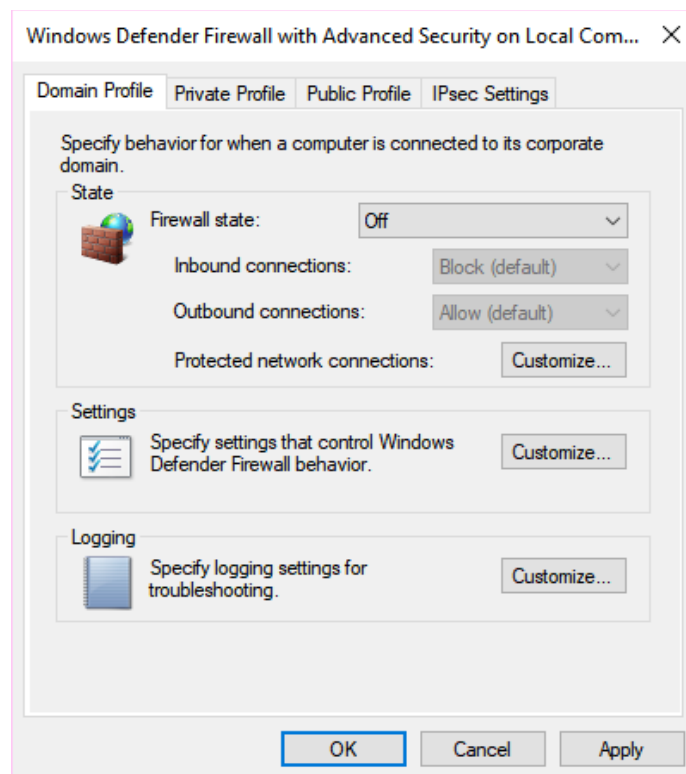


From the options list on the left, select “Advanced Settings” and open the “Windows Firewall and advanced security” window.



Click the “Windows Defender Firewall Properties” button and open the “Properties” dialog box (Windows Firewall if Windows 8 and below).

Select the “Domain Profile” tab and set the “Firewall State” to off, then select the “Private Profile” and set the “Firewall State” to off, and then select the “Public Profile” and set the “Firewall State” to off.



2.5. MAC OS/X prerequisites

The MAC OSX version of **Motion Viewer** requires that ffmpeg version 4.0 or newer is installed in your computer. The simplest way to install ffmpeg on MAC is with Homebrew.

Install Homebrew

From the Applications folder, open the Utilities folder and select "Terminal"

Copy and paste the following line:

```
/usr/bin/ruby -e "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install)"
```

Install ffmpeg

Once Homebrew is installed, type the following text.

```
brew install ffmpeg
```

Homebrew will install ffmpeg with many of the common codecs including H.264.

For more info about Homebrew, visit the following website.

www.brew.sh

Update homebrew and/or ffmpeg

If Homebrew is already installed on your computer, you may have to update it. To do so, type the following from a Terminal window.

```
brew update
```

Then type the following to check if ffmpeg should be upgraded

```
brew outdated
```

If ffmpeg appears in the list, type the following and upgrade it

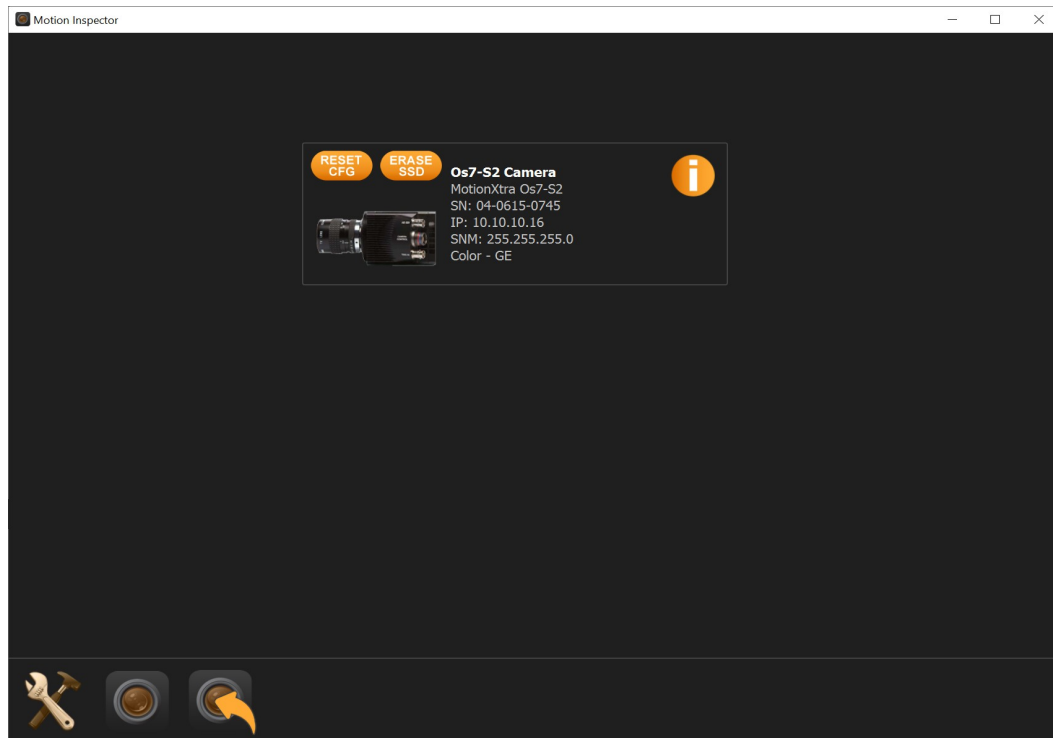
```
brew upgrade ffmpeg
```

Make sure that ffmpeg version 4.0 or newer is installed

```
brew info ffmpeg
```

3. Motion Inspector™

Motion Inspector allows the user to control one or two cameras, acquire and save/play-back image records. Once the program is started, the window below appears.



3.1. System Menu

Click the button on the bottom left area of the main window to open the system menu.

- **Full screen:** sets MI to full screen (F11 key).
- **Options:** opens the general options window.
- **Motion Viewer:** starts the Motion Viewer.
- **Manual:** opens the manual.
- **About:** opens the About Box and display information about the version.
- **Exit:** exits the program.

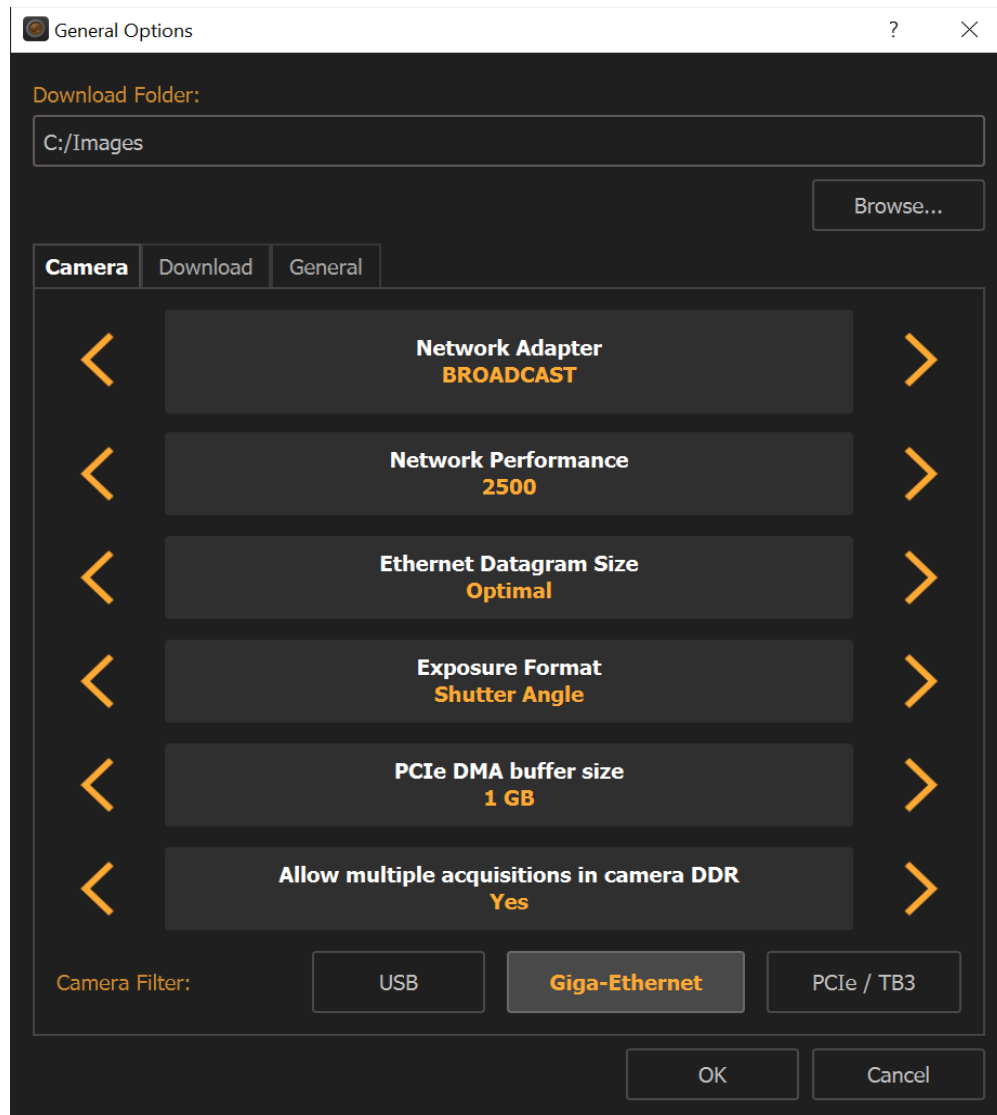
3.1.1. Camera enumeration button

Click the camera button to search for cameras and refresh the camera list.

3.1.2. Load camera layout

The camera configuration (layout) may be saved in a file on the local hard disk. Click this button to open a list of saved layouts and configure the camera with one of them.

3.1.3. General Options



Download folder: click Browse to change the folder where the images are downloaded.

Network Adapter: select the network adapter connected to the Ethernet cameras. If you select “Broadcast” the software will search for cameras from each adapter in your computer.

Network performance: it’s a delay added to the data transmission between the cameras and the computer. If there is traffic in the local network, click the right arrow to increase the value and avoid loss of data during communication.

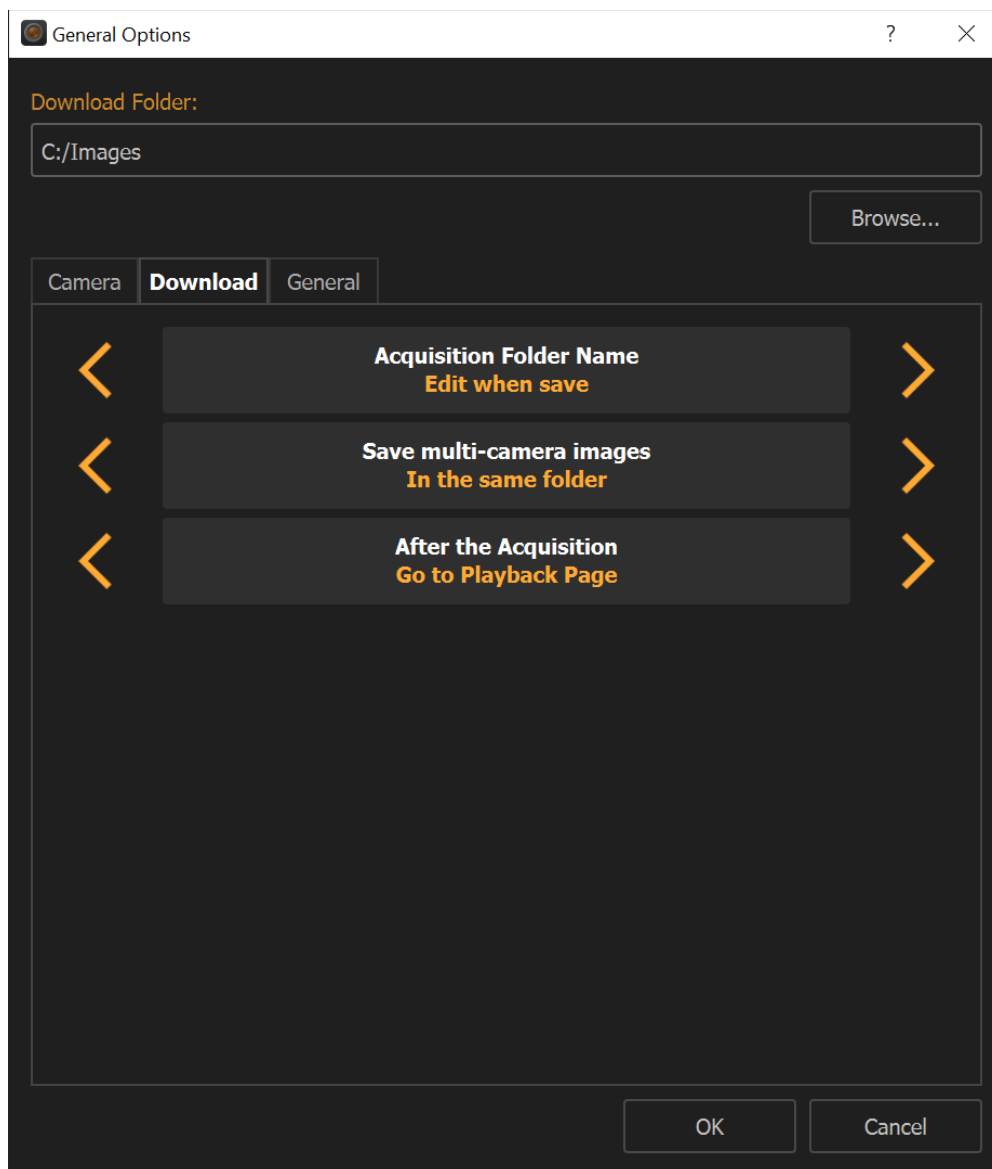
Ethernet datagram size: see below.

Exposure format: the exposure may be displayed in microseconds or in degrees (shutter angle).

PCI buffer size: select the size of the buffer used by PCIe/TB cameras.

Allow multiple acquisition in camera DDR: if this option is set to 'No', the camera DDR is not divided into segments and only one acquisition is stored.

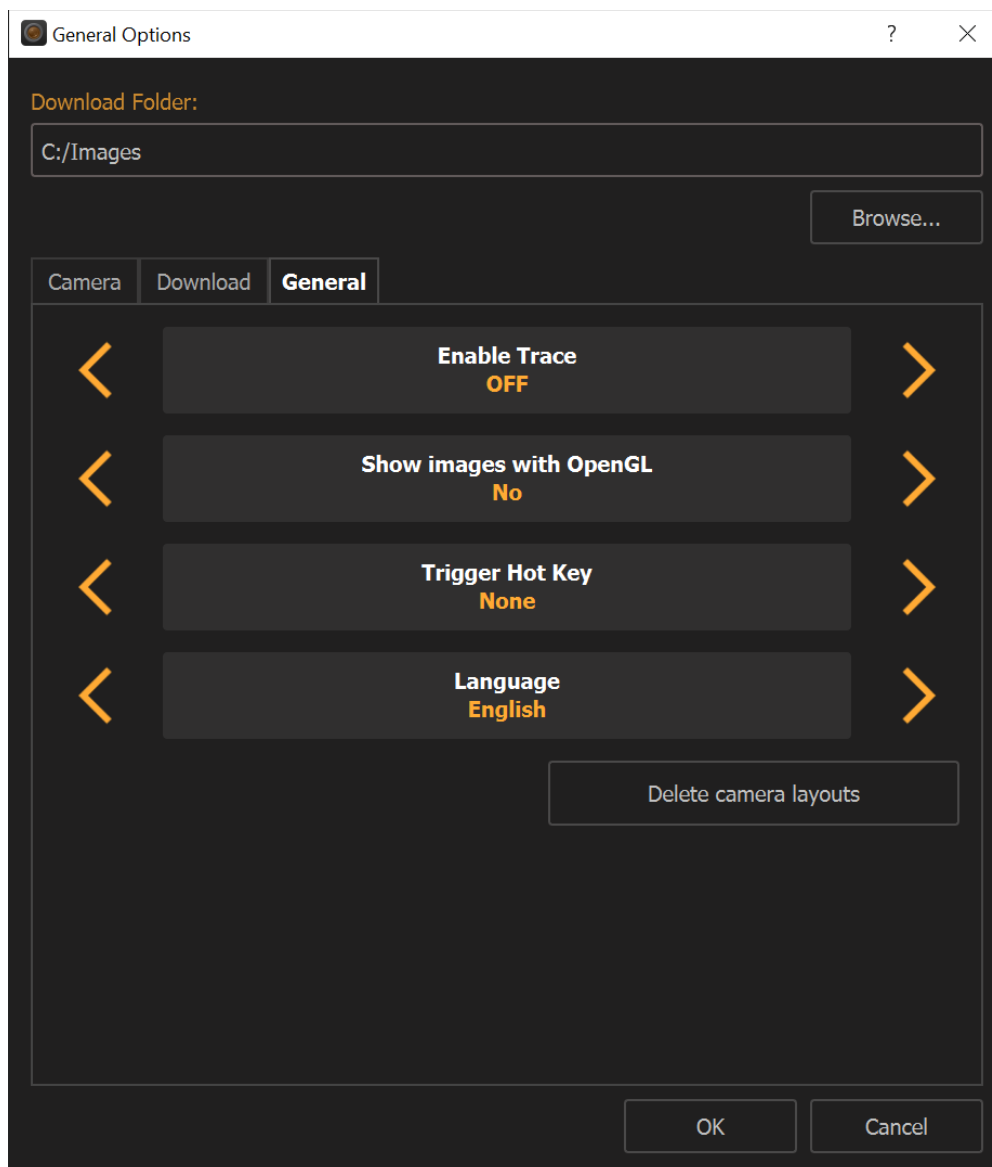
Camera filter: select or deselect the links installed on cameras.



Acquisition Folder Name: each time a sequence is downloaded a new folder is created. The name may be a combination of date and time or it may be edited by the user.

Save multi-camera images: if two cameras are open in 3D mode, the images may be save into separate folders or in the same folder (3D).

After the acquisition: when the trigger is received and the images acquired, MI can automatically download and erase the memory or open the payback page.



Enable Trace: enable and disable the trace. The trace file (mi_trace.txt) is stored in the download directory.

Background: select the color or the background.

Show images with OpenGL™: the user may select is the camera image is displayed with OpenGL (faster) or with a regular image (slower).

Trigger Hot Key: software trigger can be sent to cameras by pressing a configurable keyboard key.

Language: select language and restart Motion Inspector.

Note on Motion Inspector for iPad™: Some of the options above are not available on Motion Inspector for iPad.

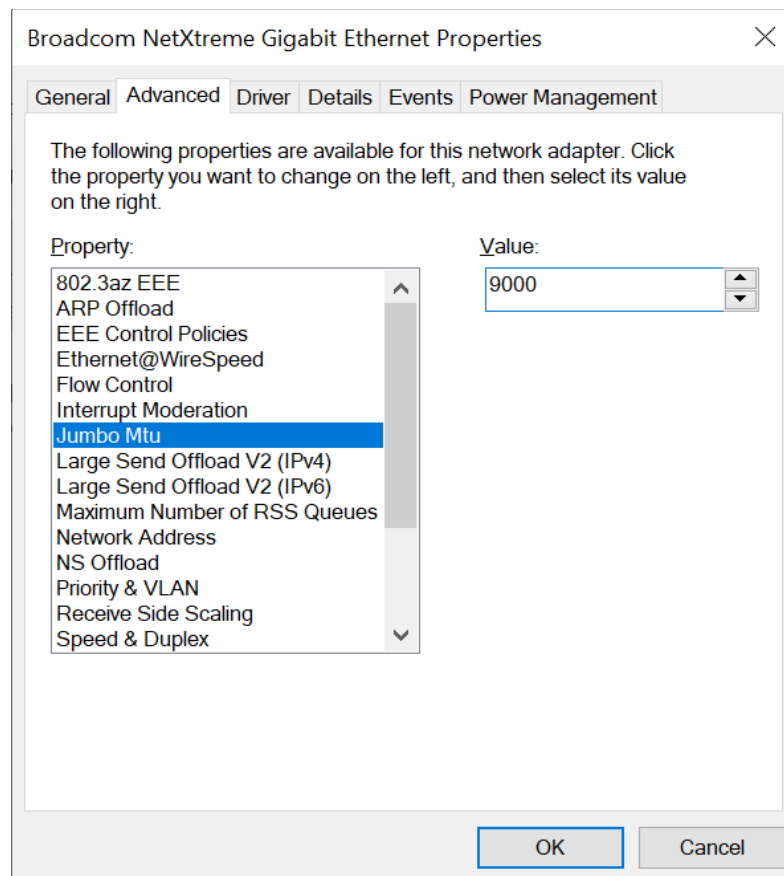
3.1.4. Large datagram size (Jumbo packets)

Most of Giga-Ethernet network adapters are able to send and receive large data packets. The usual datagram size is 1500 bytes. Large datagram packets, called Jumbo packets, can be up to 9000 bytes large.

If both camera and network adapter can use jumbo packets, transfer speed is increased. To activate jumbo packets, do the following.

3.1.4.1. Configuring Jumbo packets on Network adapter (Windows)

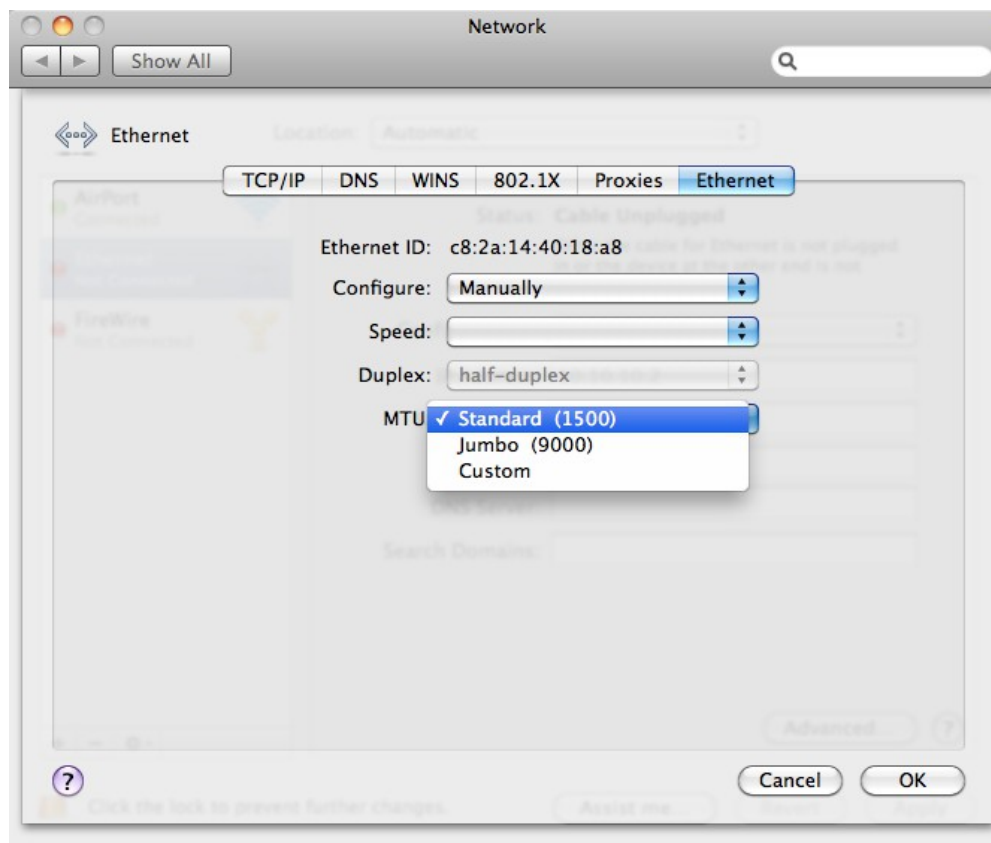
1. From Windows “Start” menu, open the “Network Connections” window and select the network adapter.
2. Right click and select Properties menu item.
3. From Properties dialog box, click the “Configure...” button.
4. From network adapter configuration dialog, select the “Advanced” tab.



5. From the property list, locate the “Jumbo Mtu” item (or anything similar to that) and change the value from 1500 to the maximum (usually 9000).

3.1.4.2. Configuring Jumbo packets on the Network adapter (MAC OS X)

1. From the System preferences, select Network.
2. Select the network adapter and click “Advanced”.
3. Select the “Ethernet” page.



4. Change “Configure” from “Automatic” to “Manual” and modify the MTU to a value larger than 1500.

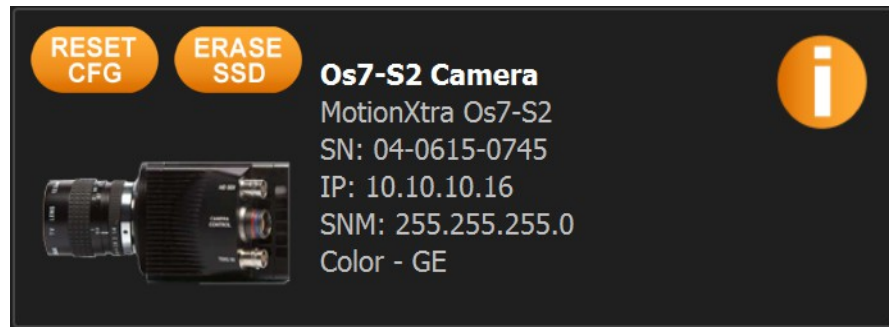
Configuring Jumbo packets on the camera

1. From the Motion Inspector “System” menu, select Options.
2. If the “Ethernet datagram size” is set to “optimal”, there is no need to change it, otherwise select any size that is “smaller” than the value selected in the network adapter configuration.

NOTE: in some network environments the maximum datagram size might be not supported and the cameras may time out and/or behave in a strange way. To avoid that, reduce the datagram size on both the adapter and the camera.

3.2. Cameras

Every detected camera is shown as a single button (see below).



- **Info:** click the info button to show the camera information.
- **Reset Cfg:** if this option is selected the camera configuration is reset when the camera is open.
- **SSD Erase:** this option appears only on cameras with on-board SSD. If the option is selected, all the images stored in the SSD are erased.

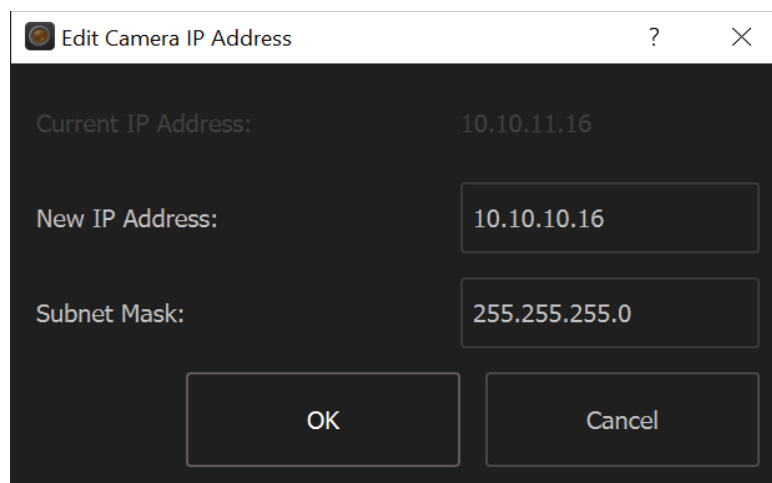
3.3. Wrong Camera IP address

If the camera IP address and the computer IP address are not compatible, the camera button is shown with a red warning message (see below)



To configure the camera with a correct IP address:

- Click the camera button.
- Enter the correct values of IP address and sub-net mask. Motion Inspector suggests a value that is compatible with the computer IP address.
- Click OK.
- Wait a few seconds: the camera needs to restart.



3.4. Edit camera name and IP address

Click the info button on camera icon.

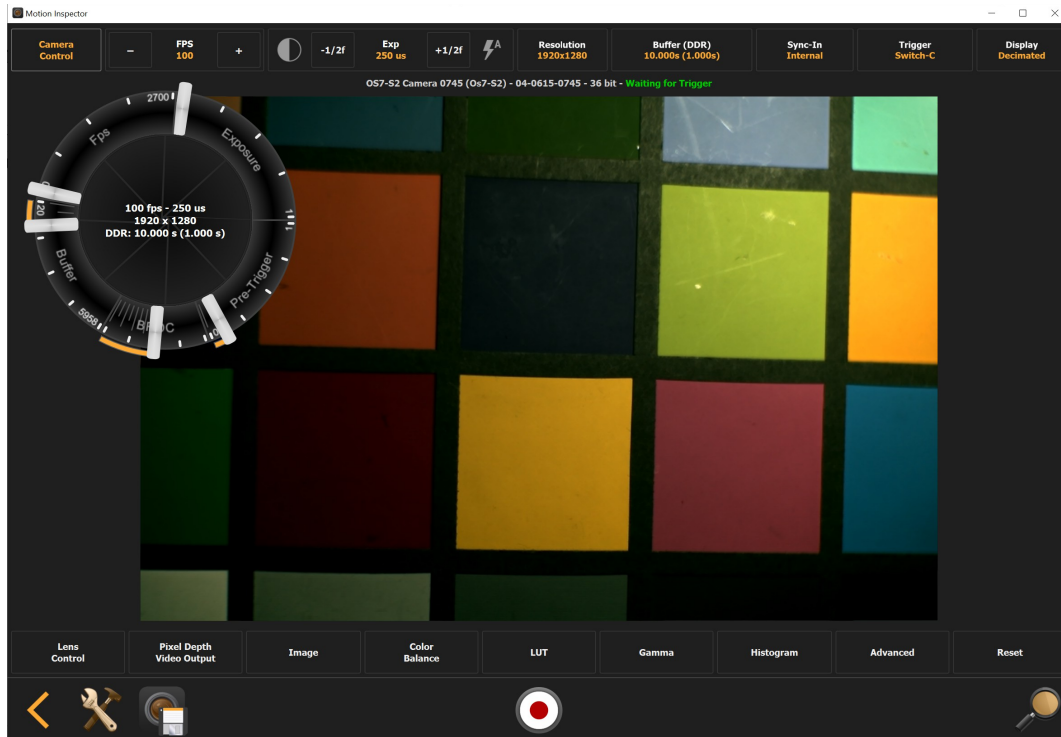
Camera info ×

Name	Os7-S2 Camera
IP Address	10.10.10.16
Subnet Mask	255.255.255.0
Model	MotionXtra Os7-S2
Serial Number	04-0615-0745
Color	Yes
Firmware Versions	227.226
MAC Address	00:25:16:00:38:1d
DDR Size	7.82 GB
SSD Size	238.40 GB

Click on name label, IP address or sub-net mask and modify the value. Click the “Close” button to confirm the changes.

3.5. Camera operation

Click the camera button and the camera will be armed and ready for acquiring. The camera parameters may be configured by clicking the buttons with orange text on top and bottom bars.

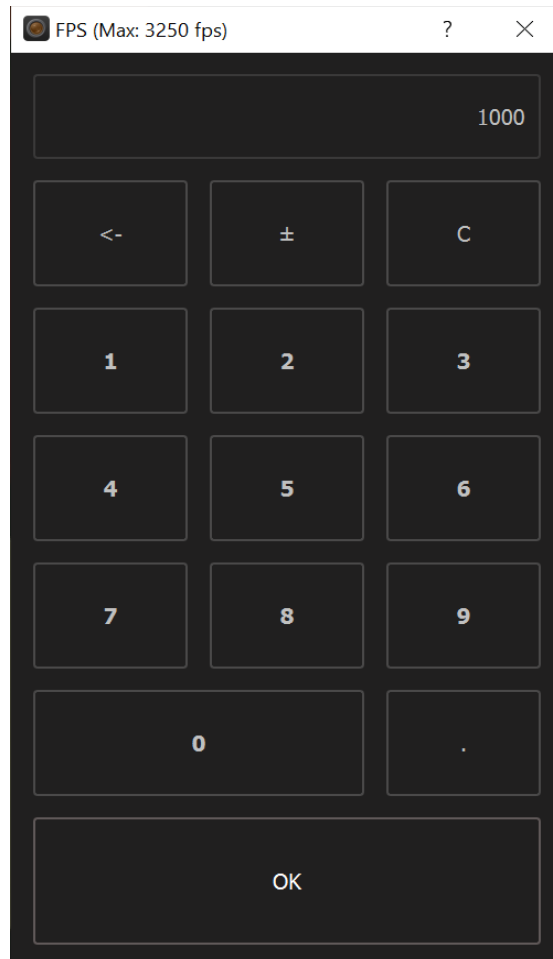


The top left button (Camera Control) activates a wheel with sliders for the configuration of exposure, frame rate, number of frames and pre-trigger.

The Back button on the left side of the image (<) closes the camera and returns to the camera enumeration view.

3.6. Rate (fps)

Click the Plus and minus buttons to increase or decrease the camera frame rate. Click or tap on the rate value to open the Touch-pad and manually set the frame rate. The Touch-pad may be used for the configuration of any other parameter.



3.7. Exposure

Click the plus or minus buttons to increase or decrease the exposure by one half of f-stop.
Click or tap on the exposure value to open the Touch-Pad (see above).

3.7.1. Low Light

Click the low light button to set the frame rate to 30 fps and automatically increase the exposure to the maximum.

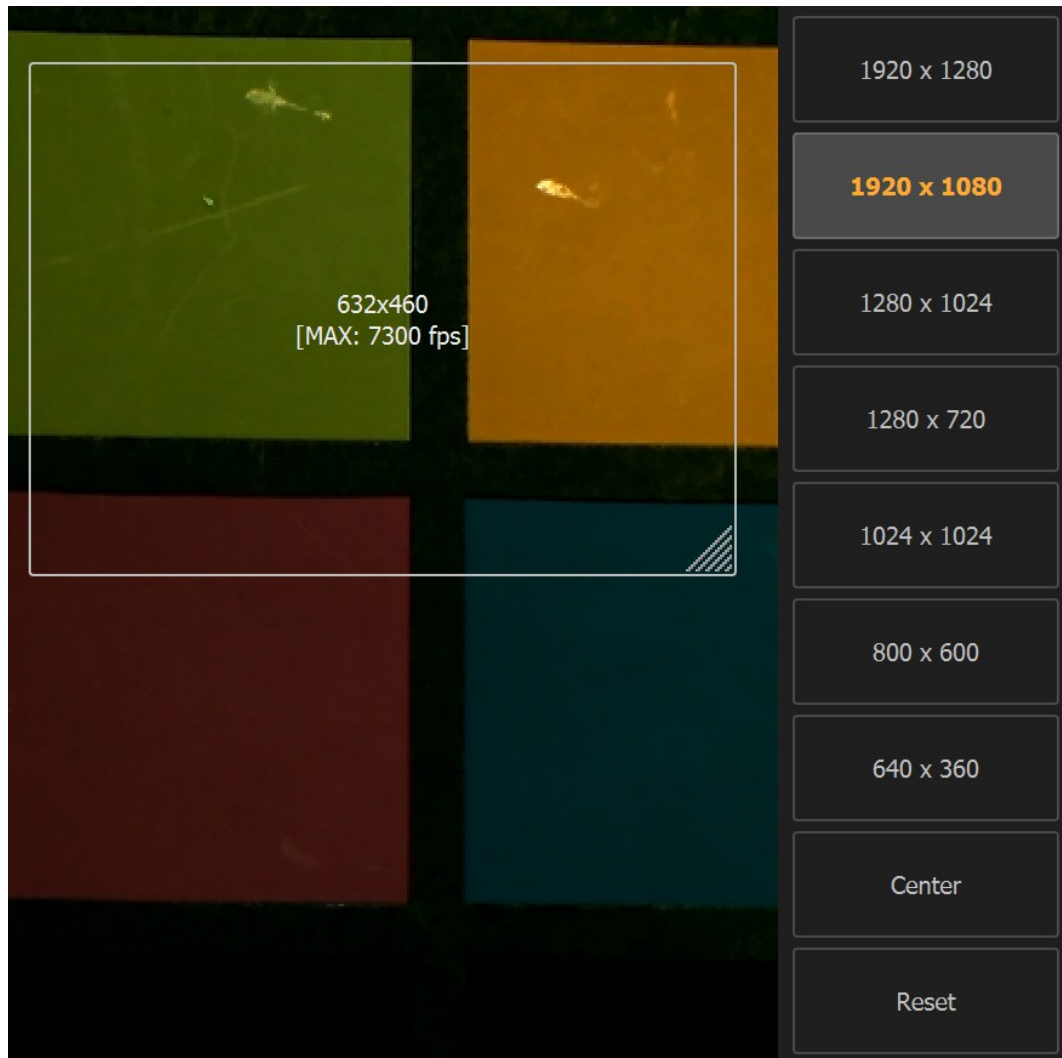
Click the low light button back to set exposure and rate to their original values.

3.7.2. Auto-Exposure

The interface is a dark-themed control panel for Auto-Exposure. It includes two horizontal sliders at the top: 'Target' with 'Darker' and 'Brighter' labels, and 'Feedback' with 'Less' and 'More' labels. Below the sliders are two rows of controls for 'Min Exp' and 'Max Exp', each with minus and plus buttons. A section titled 'Exposure Range' displays 'Min Limit' (1), 'Exp' (77), and 'Max Limit' (997). The bottom section shows f-stop values: '<< F# 6.27', 'F# 9.96', and 'F >> 3.69'. An 'Apply' button is located at the bottom center.

- Click the AE button to start Auto-Exposure configuration.
- Move the target grid or use the handle to change its size.
- Modify the Target reference and the feedback (reaction speed).
- Change the Min and Max Exp values to modify the exposure range.
- Click Apply to send the parameters to the camera and starts acquiring in Auto Exposure mode.

3.8. Resolution



Move and/or resize the grid with the handle or select one of the preset resolutions.

Center: centers the grid in the full resolution window.

Reset: sets the grid size to the maximum.

3.9. Buffer size (DDR)

Max Length: 1388

Set to Maximum Set 100% pre-trigger

Length
1000 (1.000s)

Pre-Trigger
100 (0.100s)

BROC

BROC Length
500 (0.500s)

- Select SSD Off (record in DDR). Cameras without SSD or SD-card do not have this option.
- Click the plus or minus buttons to increase or decrease the values of buffer size and pre-trigger.
- BROC: if the option is selected, click the BROC length plus and minus button to set the size of each BROC segment.

3.10. Buffer size (SSD or SD-Card)

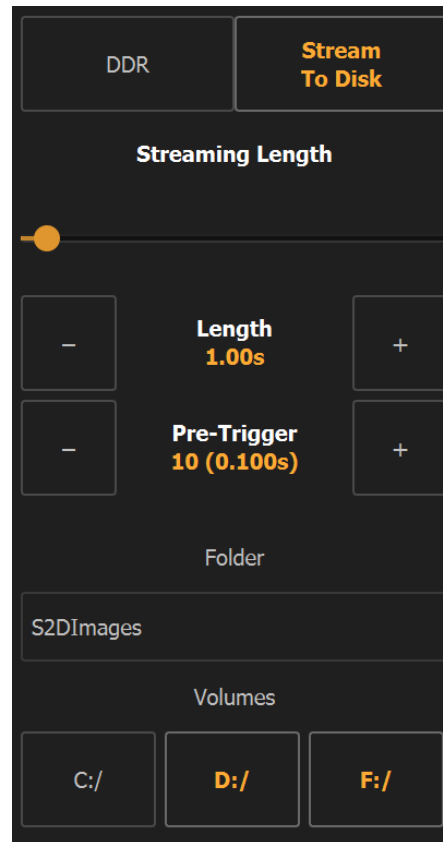
SSD Off	SSD Backup
Max Length: 1388	
Set to Maximum	Set 100% pre-trigger
–	Length 1000 (1.000s)
–	Pre-Trigger 100 (0.100s)
BROC	
Auto backup at next power cycle OFF	
Restart from first undone segment OFF	
–	Segments 1

Click the plus or minus buttons to increase or decrease the values of buffer size and pre-trigger. BROC: if the option is selected, click the BROC length plus and minus button to set the size of each BROC segment.

Auto-backup at next power cycle: at next camera power cycle the camera is armed. When the trigger is received the images are acquired and saved in the SSD (if the camera is Os). Then the camera is armed again and the procedure repeated until the value set in “segments” field is reached.

Restart from first undone segment: the user can record a few segments and reboot the camera, then the firmware starts recording from the first undone segment, and so on until all the segments are recorded. If this option is off, when the camera is rebooted and not all the segments have been recorded, the firmware starts from the beginning.

3.11. Stream images to local disk



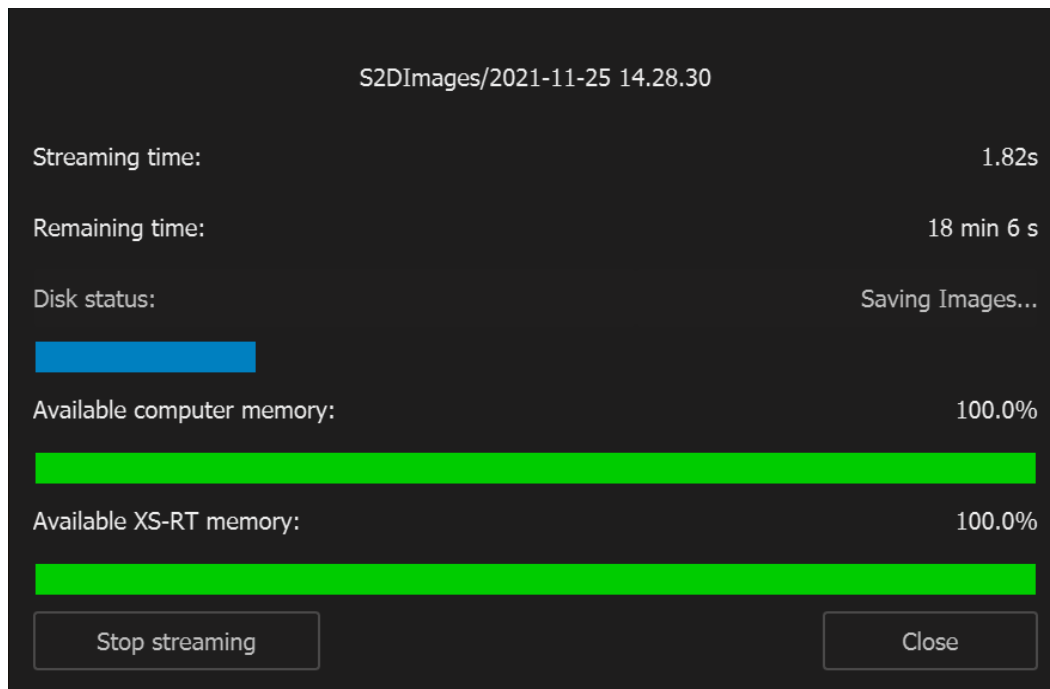
Direct stream to disk can be enabled on PCIe and XS-Mini cameras. Images are recorded and directly save din local computer storage. If more than one disk is selected, images are evenly stored in each drive, with increased speed.

If “Stream To Disk” is selected, streaming length can be set to “Free” or to a defined time by operating the corresponding slider and buttons.

If “Length” is set to “Free” the recording length is limited only by the room in the local disk. Streaming is started and stopped by clicking the trigger button.

If “Length” is set to a defined time value, first click on trigger button starts the streaming. It stops when the configured time has been recorded ans saved.

Once streaming is configured, a status panel appears. It shows the status of local computer DDR and XS-RT module memory.

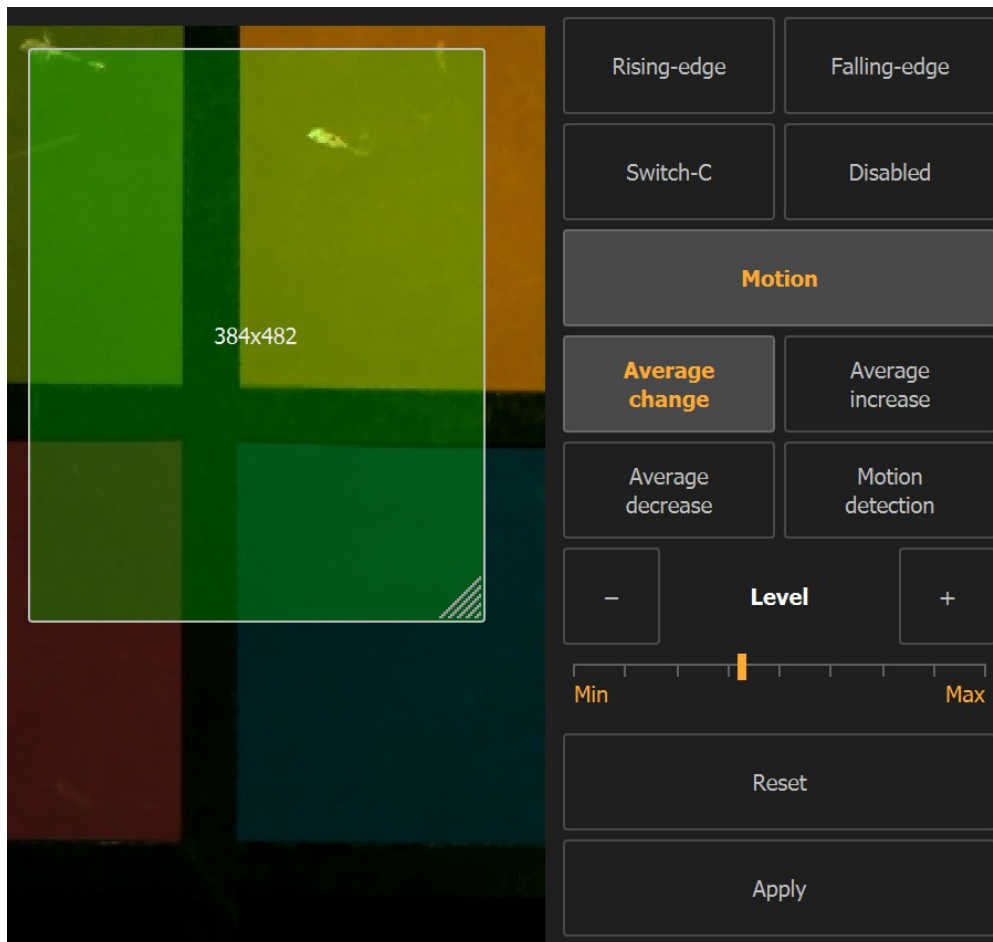


3.12. Sync In

The camera Sync source may be configured. If an external sync source is detected by the camera, the user may select one of the “external” modes; otherwise only “internal” is allowed.

3.13. Trigger In

Select one of the options (rising edge, falling edge, switch closure, disabled or motion).



3.13.1. Motion trigger

- Click the Motion Trigger button.
- Select the motion option (Average or motion detection) and increase or decrease the level.
- Move and/or resize the rectangular grid and test the condition by checking if the background color changes from red to green.
- Click Reset to reset the reference parameters.
- Click Apply to start the acquisition. If the MT condition is true, the camera triggers.

3.14. Lens Control

Some cameras (O, Os, XStream PCIe and Mini) are equipped with motorized lens support. Focus, iris and, in some cases, zoom can be controlled in Motion Inspector.

To activate the lens control bar, click the “Lens Control” button on the bottom camera bar.

Focus, aperture and zoom (if supported) can be controlled with two side buttons that allow more precise configuration.



3.15. Pixel Depth / Video Output

24 bit upper	24 bit middle	24 bit lower
27 bit upper	27 bit middle	30 bit
33 bit		36 bit
PC Output	HDSOI Output	Overlay
1080p 60Hz	1080p 50Hz	1080p 30Hz
1080p 25Hz	1080p 24Hz	720p 60Hz
720p 50Hz	720p 30Hz	720p 25Hz
720p 24Hz		

Pixel depth: 8, 9 or 10, 11 or 12-bit for monochrome cameras, 24, 27, 30, 33 or 36-bit (RGB) for color cameras. If 8/24-bit or 8/27-bit are selected, the user may select the upper, middle or lower bits.

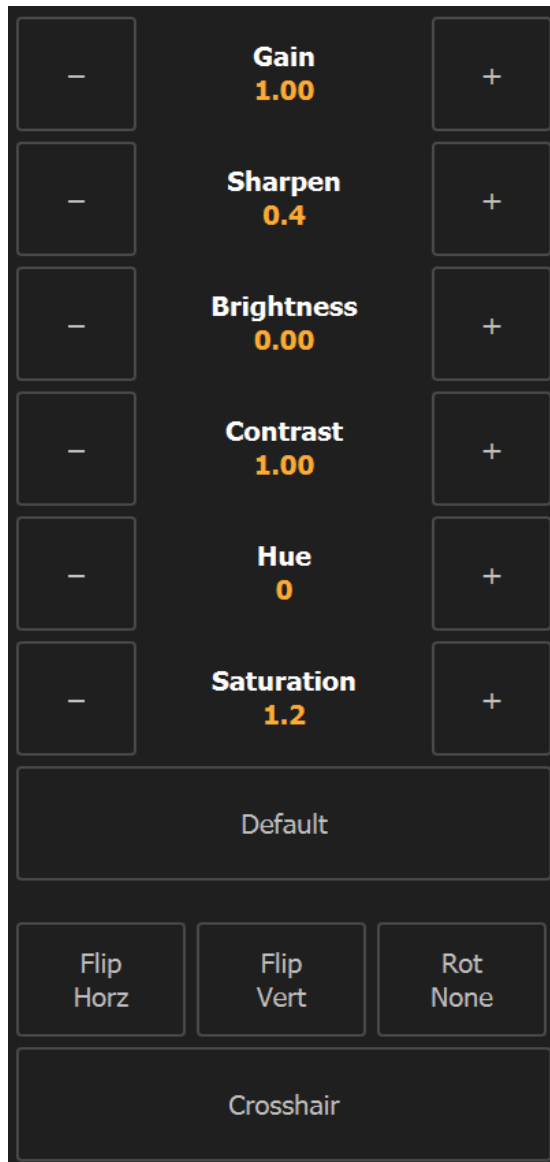
Video output: this configuration is available only on Y, Os and CC cameras.

PC output: the images are displayed on the computer video.

HDMI/SDI output: the images are displayed on the HDMI output.

HDMI/SDI format and overlay: not all the HDMI devices support the available resolutions. If Overlay is selected some of the camera parameters are shown on video.

3.16. Image



Gain: the sensor gain values are 1.00 (default), 1.41, 2.00 and 2.82.

Sharpen: adds a sharpening filter to the image. The range is from 0.0 to 1.0 with 0.1 steps.

Gamma: adds a gamma correction to the image. The range is from 0.5 to 2.0 with 0.1 steps.

Brightness: it changes the image brightness. The range is from -0.25 to 0.25

Contrast: the contrast value goes from 0.5 to 1.5. The default is 1.0.

Hue (color only): it changes the image hue from -180 to 180.

Saturation (color only): it configures the image saturation from 0 (monochrome) to 2.

Default: click this button to set all the parameters to the default value.

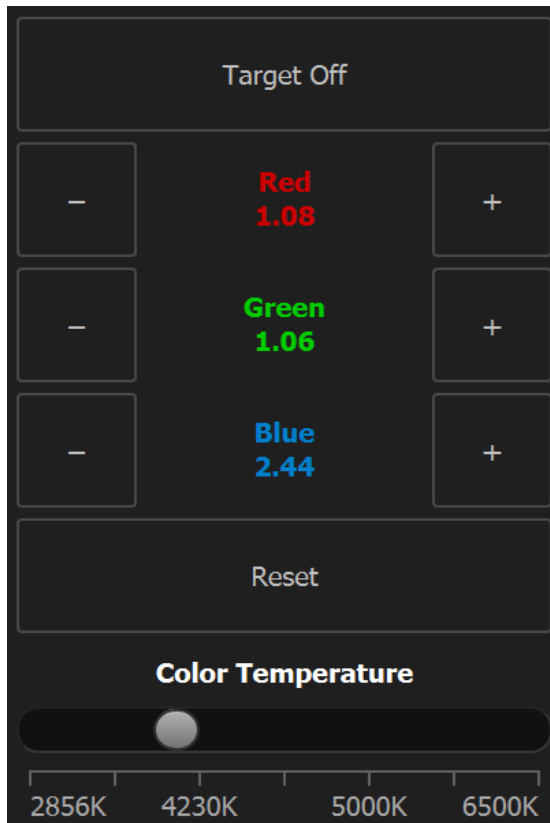
Each parameter may be directly entered with the Touch-Pad by clicking on the corresponding label.

Flip Horizontally or vertically: the image may be flipped.

Rotation: the image may be rotated by 90, 180 or 270 degrees.

Crosshair: when this option is selected a cross-hair is shown in the middle of the image.

3.17. Color Balance



- Click the target button to activate the cross target cursor.
- Click on a point of the image to calculate the white balance parameters.
- Click Reset to set the gain values to 1.0.

If color temperature tables are stored in camera flash, “**color temperature**” can be configured (slider).

3.18. Paint parameters

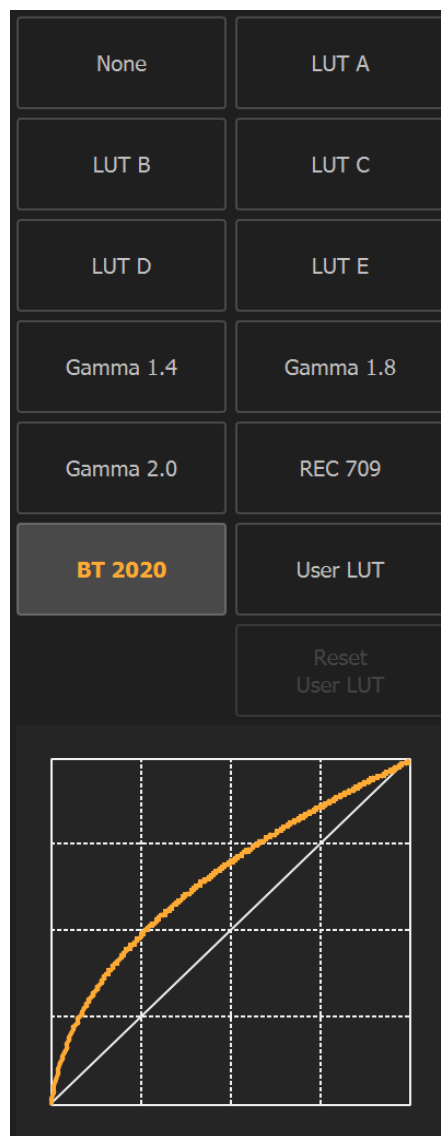
−	Gain R 1.00	+
−	Gain G 1.00	+
−	Gain B 1.00	+
−	Pedestal R 0.00	+
−	Pedestal G 0.00	+
−	Pedestal B 0.00	+

Some camera models support color gains and pedestals.

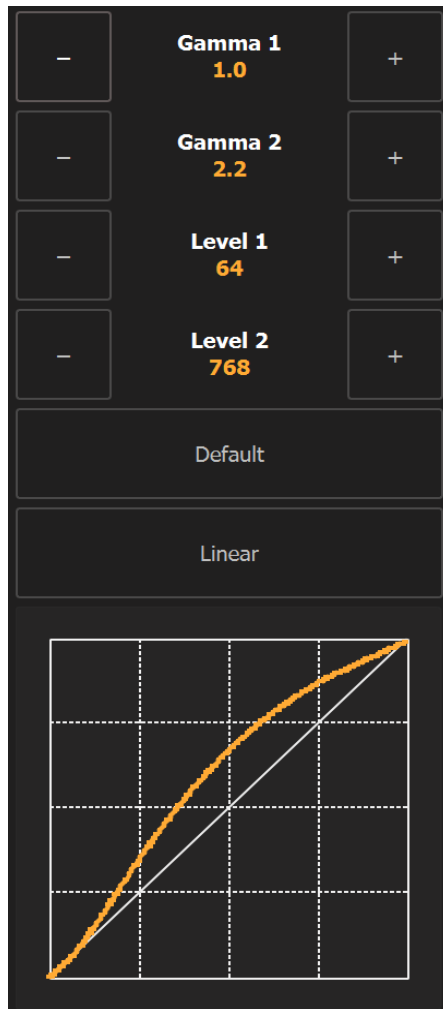
3.19. Lookup Tables (LUT)

The *lookup table* (LUT) transformations are basic image-processing functions that you can use to improve the contrast and the brightness of an image by modifying the dynamic intensity of region with poor contrast. LUT transformations can highlight details in areas containing significant information, at the expense of other areas

The user may select a Lookup Table from a list of four pre-defined tables or select “User” and drag the red circles to generate a custom LUT.



3.20. Gamma



The gamma curve is divided into three zones:

From 0 to Level 1: Gamma 1 value is applied

From Level 1 to Level 2: linear combination of Gamma 1 and Gamma 2 is applied.

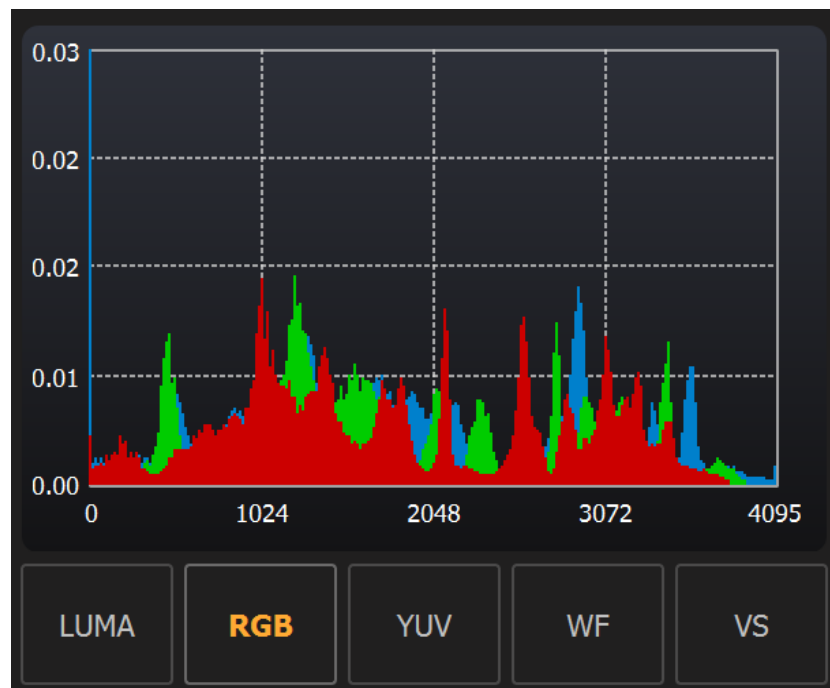
From Level 2 to the maximum (255 for 8 bit, 1023 for 10 bit): Gamma 2 value is applied.

3.21. Histogram/Scope

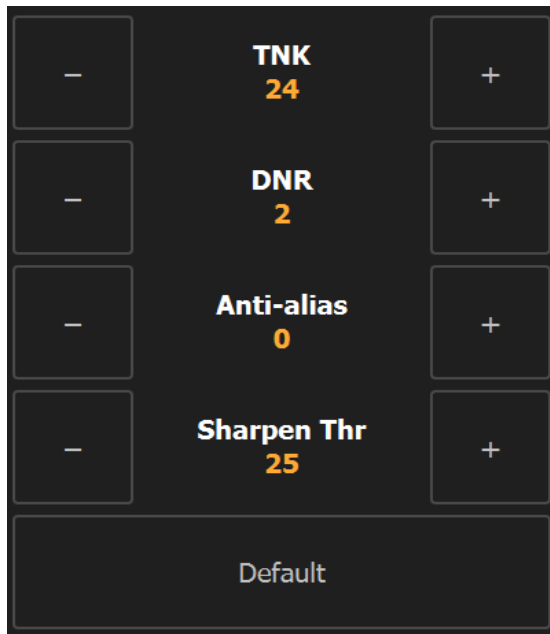
Mono cameras: the histogram is computed on the gray component.

Color cameras: three histograms may be displayed.

- **LUMA:** luminance.
- **RGB:** Red, Green and Blue components.
- **YUV:** YUV components.
- **WF:** waveform profile
- **VS:** Vector-scope.



3.22. Advanced



TNK (Temporal Noise Killer): adds a filter that removes temporal noise. The range is from 0 (no filter) to 5 (full filter).

DNR: adds a filter that removes noise from the image.

Anti-Alias (Gaussian): add a Gaussian blur filter to the image. The range goes from 0 to 16.

Sharpen Threshold: edit the threshold used for sharpening.

Default: click this button to set the parameters to their default value.

3.23. Reset

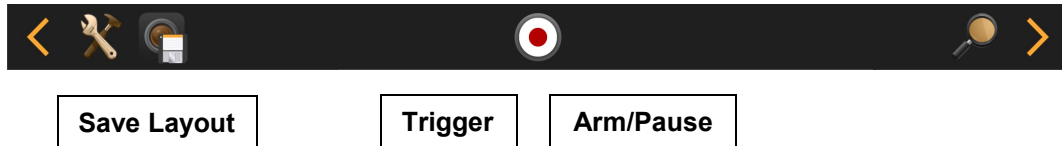
Click this button to reset the camera.

3.24. Zoom

Click the magnifier icon on the bottom left edge of the window to activate the zoom menu.

Fit: the image is zoomed to fit in the window.

3.25. Camera Operation



Save layout

The camera configuration can be saved in a layout file and restored before opening the camera.

Record images

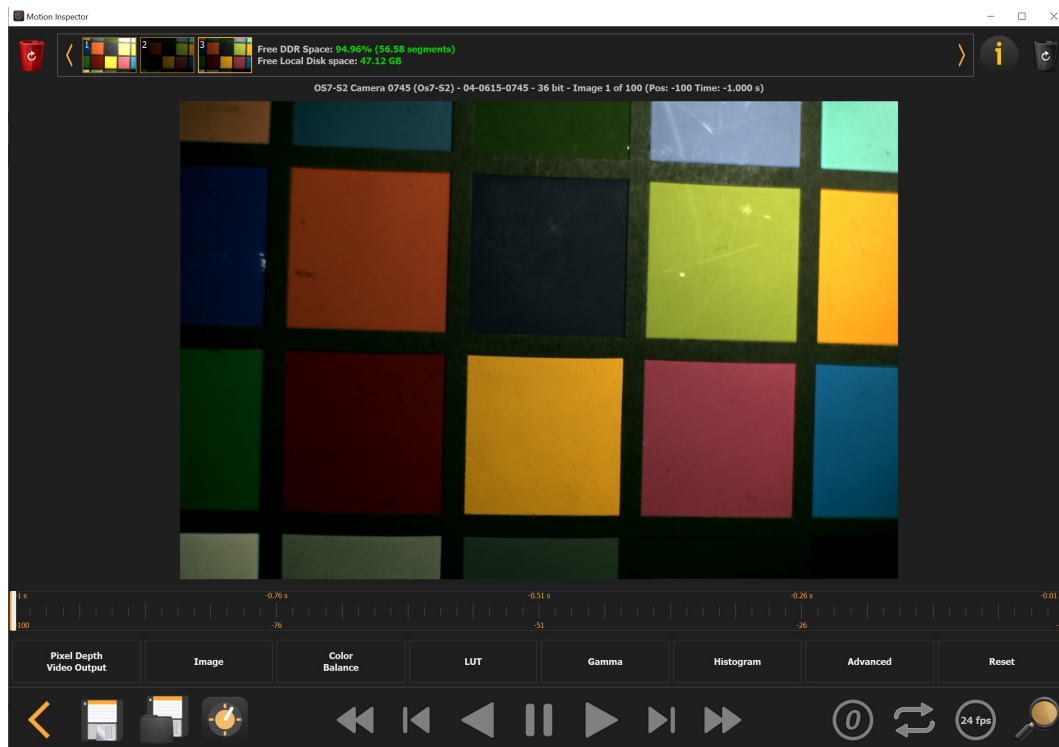
If the camera is armed and ready for triggering the red Trigger button on the bottom gray bar is enabled. The trigger may be activated in two ways:

Software: click the trigger button to generate a software trigger.

Hardware: through a signal to the trigger in BNC connector.

When the trigger occurs and the camera completes the acquisition, the playback page is activated.

3.26. Playback images



Top controls

Red recycle bin: double click this button to erase the camera memory and re-arm the camera.

Acquisition List: each thumbnail shows a different memory segment with a single acquisition. The acquisition info is shown as a tool tip when the mouse is on the thumbnail. The amount of camera memory and free disk space is also displayed.

Info button: click this button to see the camera DDR or SSD usage.

Black recycle bin: the latest acquisition may be erased by clicking this button.

Bottom controls

Slider: move the slider back and forth to display a specific frame of the sequence.

Min and Max Handles: the orange handles are useful to set the limits of playback.

Save: click this button to start download (RAW or SDI, if camera supports it).

Daily folder: daily folder is an additional folder that is created when images are saved. It can be modified at any time before saving images.

Time Stamp: click this button to configure time stamp (see next topic).

Zero: Zero button allow the user to modify the position of trigger frame (zero frame). Two options can be selected. In both cases, the user must move the cursor to the frame that wants to modify.

- Set the current frame as trigger frame and modify the number of pre-trigger and post-trigger frames.
- Set current frame as first frame of the sequence ("oldest frame"). In this case, the sequence is simply arranged and number of pre-trigger and post-trigger frames are not modified.

Loop: the loop button enables and disables the circular playback of the images

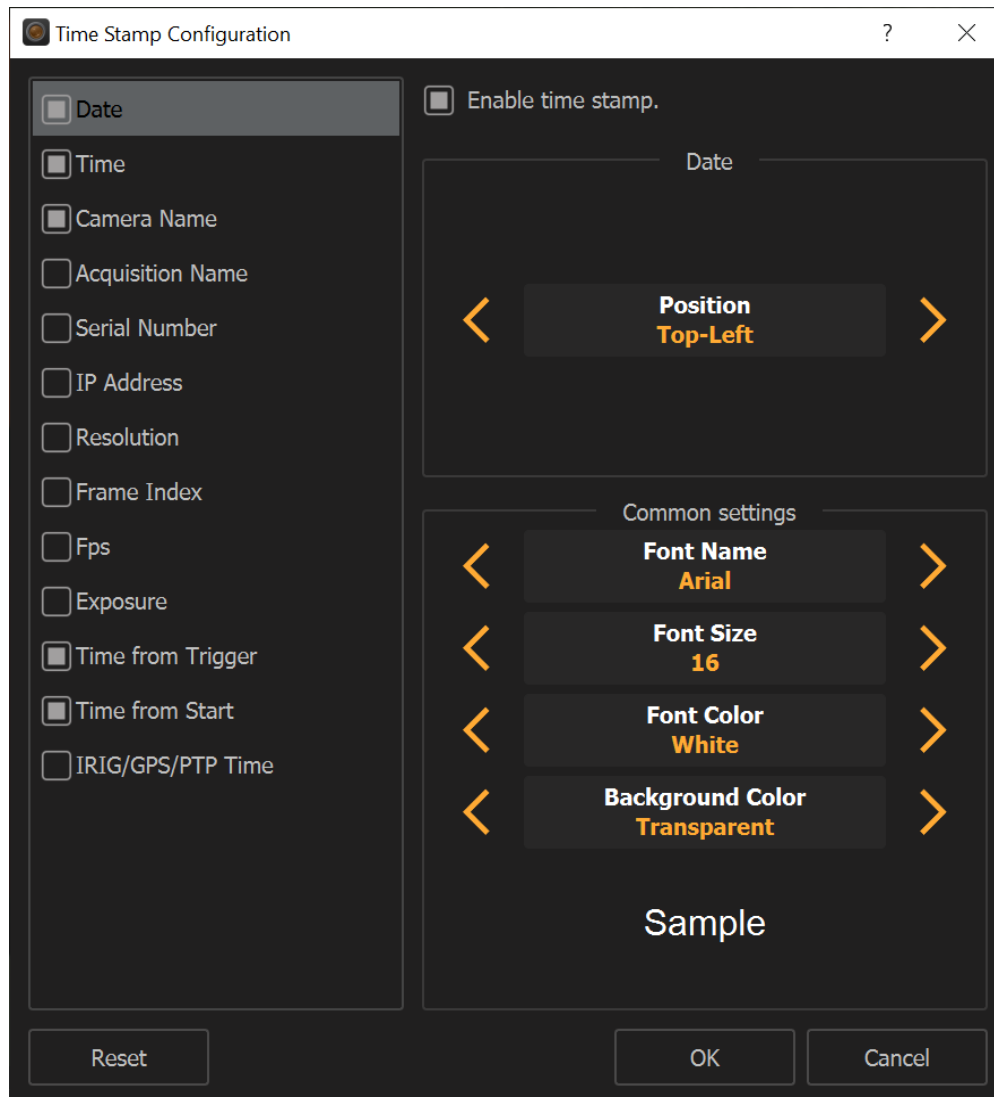
Speed: the speed button sets the playback speed (1 to 60 fps)

Camera controls

Before saving the images, the user may change some of the acquisition parameters, such as white balance, pixel depth, LUT and gamma.

3.27. Time stamp

Time stamp can be added to playback images. To enable configuration, click the clock button on bottom bar.



Items that can be added to time stamp are listed below.

- **Date:** recording date.
- **Time:** recording time.
- **Camera name:** the name of the camera.
- **Acquisition name:** name of the folder where the sequence is saved (MV only).
- **Serial number:** the camera serial number.
- **IP address:** the camera IP address.

- **Resolution:** the width and the height of the image.
- **Frame Index:** the index of current image (absolute or relative to trigger frame).
- **Fps and Exposure:** values of rate and exposure.
- **Time from trigger:** elapsed time from the trigger frame. The number of digits is configurable. You may either display in seconds with up to 6 decimal digits or in milliseconds with up to 3 decimal digits.
- **Time from start:** the time elapsed from the start of the acquisition.
- **IRIG/GPS/PTP:** IRIG/GPS/PTP date and time.

Once an item is selected from the list on the left, some parameters can be configured. Some parameters are available for each item.

Position: select the position of the time stamp item (left, center, right, top and bottom).

Some of the items have specific parameters.

- **Frame index:** origin may be absolute (from beginning of sequence) or from trigger frame.
- **Time from trigger, time from start:** "precision" in digits may be configured.
- **Fps:** select the units that are displayed in time stamp ("Fps" or "Hz").
- **Exposure:** select exposure units (milliseconds, microseconds or nanoseconds).
- **IRIG/GPS/PTP:** time is always calculated in UTC units, then an offset may be added to adapt the time to a specific time zone. Also, leap seconds can be configured.

Common settings are.

- **Font name:** select the font for the time stamp.
- **Font size:** select the font size.
- **Font Color:** select the time stamp color. If the image is monochrome, color is converted into gray scale.
- **Background color:** strings may have colored or transparent background.

3.28. Save Images

Click the save button to download images from the current acquisition. Four options are available:

- **Save RAW:** current segment images are saved in RAW format in a folder created in the download directory and daily folder. RAW sequence can be converted later with Motion Viewer.
- **Save all RAW:** save all the segments in DDR/SSD in raw format.
- **Save HDMI/SDI** (not supported by all the cameras): current segment images are sent to video output at the maximum speed supported by the HDMI/SDI device.
- **Save all HDMI/SDI:** all segments are are sent to video output.

3.29. Multiple acquisitions

After the playback, click the orange left arrow located on the left side of the window.

The software automatically locates a new segment in camera memory or SSD/SD-card and arms the camera.

If the camera memory/SSD is full, a warning message is displayed. If there's enough room the user may record multiple acquisitions, playback and save.

3.30. Multiple camera system (3D)

Two cameras may be simultaneously operated.

- Connect cameras and run Motion inspector.
- Click the 3D buttons of the cameras you wish to open.
- Click one of the camera buttons.

3.30.1. 3D display

The way the images are shown is controlled by the three buttons on the bottom left side of the window.

Cam A: the image from camera A is displayed. Some parameters such as Color Balance are updated on camera A only.

Cam B: the image from camera B is displayed. Some parameters such as Color Balance are updated on camera B only.

Cam AB: the images from camera A and camera B are combined in different ways:

Interlaced: even rows are taken from one camera, odd rows are taken from the other camera.

Anaglyph: the red-cyan anaglyph is generated by taking the red channel from one camera and the green and blue channels from the other camera.

Superposed: the images are superposed with alpha channel.

Vertically tiled (A over B): the image from one camera is displayed on the top side of the window, the image from the other camera is shown on the bottom side.

Horizontally tiled (Side by Side): the image from one camera is shown on the left side, the image from the other camera is shown on the right side.

Frame offset: this parameter allows the synchronization of live images if there is a difference.

Show Stereo window: when this option is checked a floating window is created and the output is redirected to this window. The window doesn't have any title bar or external frame, but it can be dragged and dropped around the screen or to a different monitor. If you double click on any point inside this window, it is maximized. When it's maximized, double click anywhere to return it back to the original size.

3.30.2. 3D synchronization

The following options appear if you click on the “Sync In” button with two cameras.

Internal: both the cameras run with internal sync source (not synchronized)

Master/Slave: one camera’s “Sync out” (Master) is connected to the other camera’s “Sync in” (Slave).

External: both cameras require an external sync source that synchronizes both.

When the user selects one of the sync options, the software automatically checks the connections and verifies if the scheme is correct.

Invert master sync out: the sync out signal of the master camera may be inverted.

Detect master camera: click this button to automatically detect which camera is master and which one is slave.

3.30.3. 3D Trigger

If two cameras are connected in Master/Slave mode and armed, it’s important that the trigger is hardware. If the cameras are triggered through the software (the red button), each camera will receive the trigger at a slightly different time due to Ethernet delays.

If the slave gets the trigger first, both cameras will end the acquisition although the resulting sequence may be a few frames out due to the timing difference of the trigger being received.

For hardware triggering, use a switch connected via a T-piece to the trigger input of both cameras, and ensure that 'switch closure' is set as the trigger type in the software. If you are still having problems with the trigger cable; cut the cable near the T-piece, strip away the outer, and trigger by touching the two connections (the core to the shield) together.

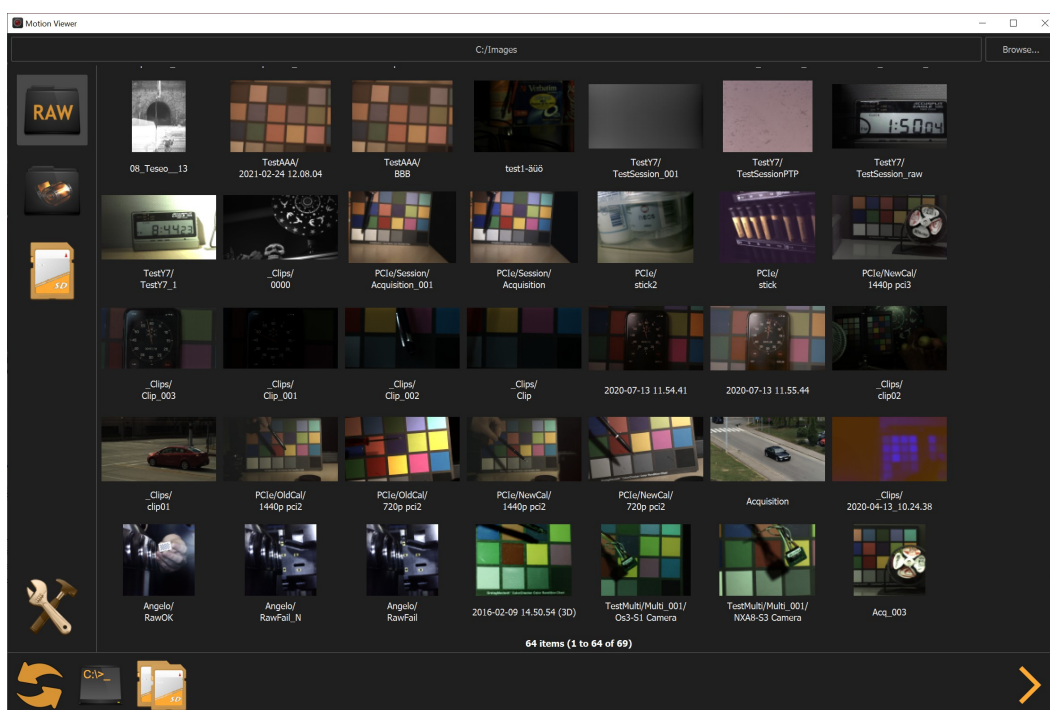
4. Motion Viewer™

4.1. Overview

With Motion Viewer you may:

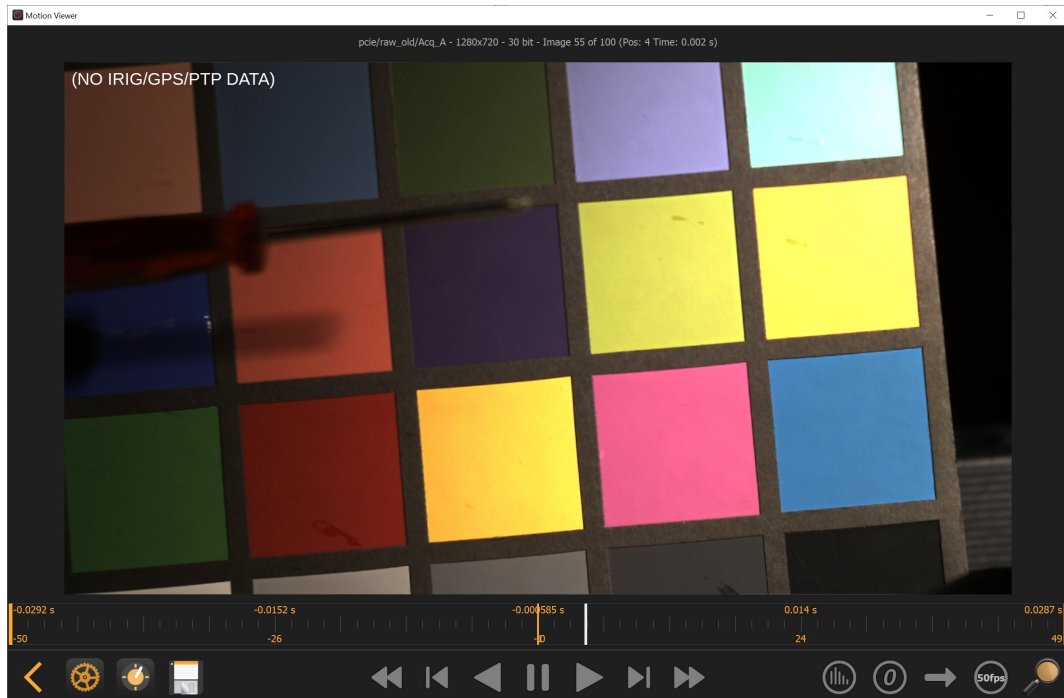
- Review and convert images saved from cameras and stored in the local hard disk.
- Review and convert image sequences.
- Review and convert images stored in any camera removable SSD or SD card connected to the local computer through an USB reader.

Note: display of images stored in a removable SSD or SD-card requires administrator privileges. To do that, open Windows explorer and locate MotionViewer.exe file, right click on file icon and select “Run as administrator”.



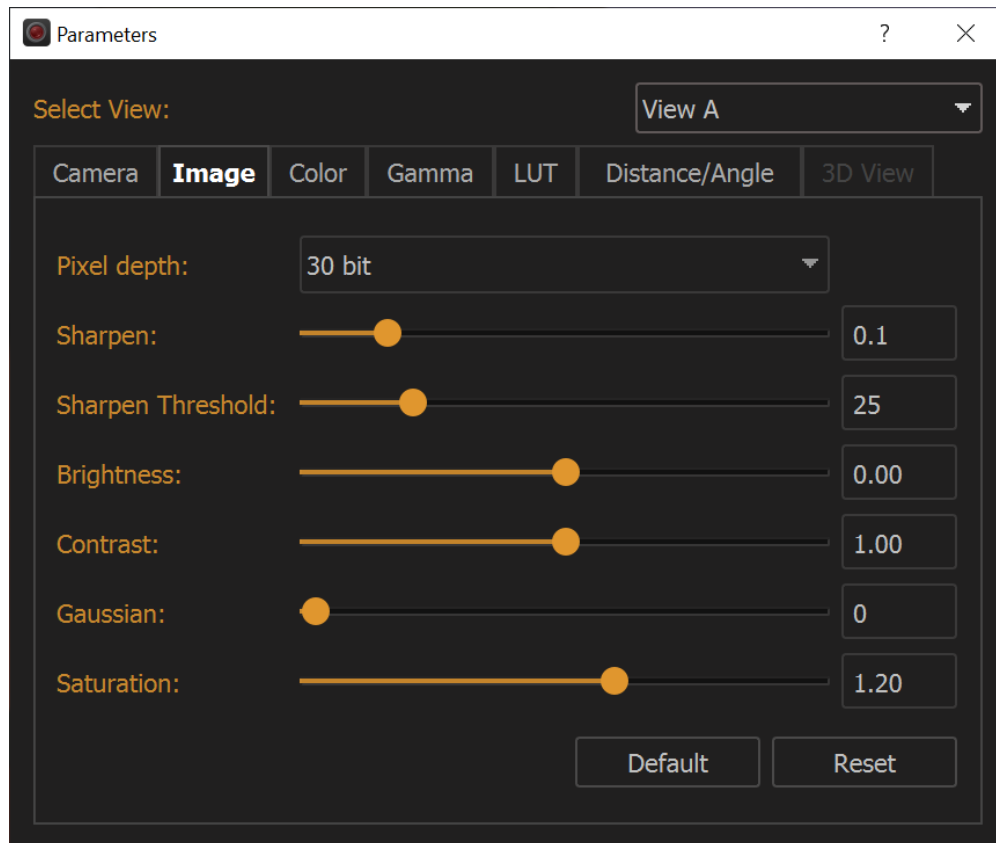
4.2. Open a RAW sequence

To open a raw file, click on the Raw icon and select one of the displayed thumbnails. Once selected, the sequence is open and displayed (see below).



- Use the playback buttons to playback the sequence in both directions.
- Use the slider to select a single frame and the Min and Max handles to select a start and a stop point.
- Click histogram button to activate histogram, waveforms or vectorscope.
- Click Zero button to change the position of frame zero (trigger frame).
- Click Loop icon to activate and deactivate circular playback of the images.
- Click speed button to increase the playback speed from 1 to 60 fps.
- Click Zoom icon to set the image zoom.
- Click gear icon to open the Parameters dialog and edit some of the parameters.
- Click clock icon to open and enable time stamp (see Motion Inspector section).
- Click Save icon to convert the sequence.

4.3. Sequence parameters



Some of the camera parameters stored in the RAW sequence may be modified.

- Image parameters
- Color
- Gamma
- Lookup Table
- Distance/Angle measurement
- 3D View: available only for 3D sequences.

In 3D sequences some parameters may be different in both views. To edit those parameters, first select the view from "Select View:" drop down list.

4.4. Compute distance or angle

Select the “Distance/angle” tab from the parameters dialog. This tool will allow calculations of distances and/or angles.

The screenshot shows the 'Parameters' dialog box with the 'Distance/Angle' tab selected. The dialog has a title bar with a red camera icon, the text 'Parameters', and window controls. Below the title bar is a 'Select View:' section with a dropdown menu showing 'View A'. A row of tabs includes 'Camera', 'Image', 'Color', 'Gamma', 'LUT', 'Distance/Angle' (which is highlighted), and '3D View'. The 'Distance' section contains two checkboxes: 'Show targets.' and 'Show rulers.'. Below these are three labels: 'Origin:', 'Units:', and 'Value:'. The 'Origin:' dropdown is set to 'Bottom-Left', 'Units:' is set to 'pixels', and 'Value:' is '591'. A text instruction reads 'Calibration: enter distance in mm and click Calibrate.'. Below this is an input field with '105', a 'Calibrate' button, and a 'Discard calibration' button. The 'Angle' section has a 'Show targets.' checkbox. Below it are 'Units:' set to 'degrees' and 'Value:' set to '70.8341'.

Parameters

Select View: View A

Camera Image Color Gamma LUT **Distance/Angle** 3D View

Distance

☐ Show targets. ☐ Show rulers.

Origin: Bottom-Left Units: pixels Value: 591

Calibration: enter distance in mm and click Calibrate.

105 Calibrate Discard calibration

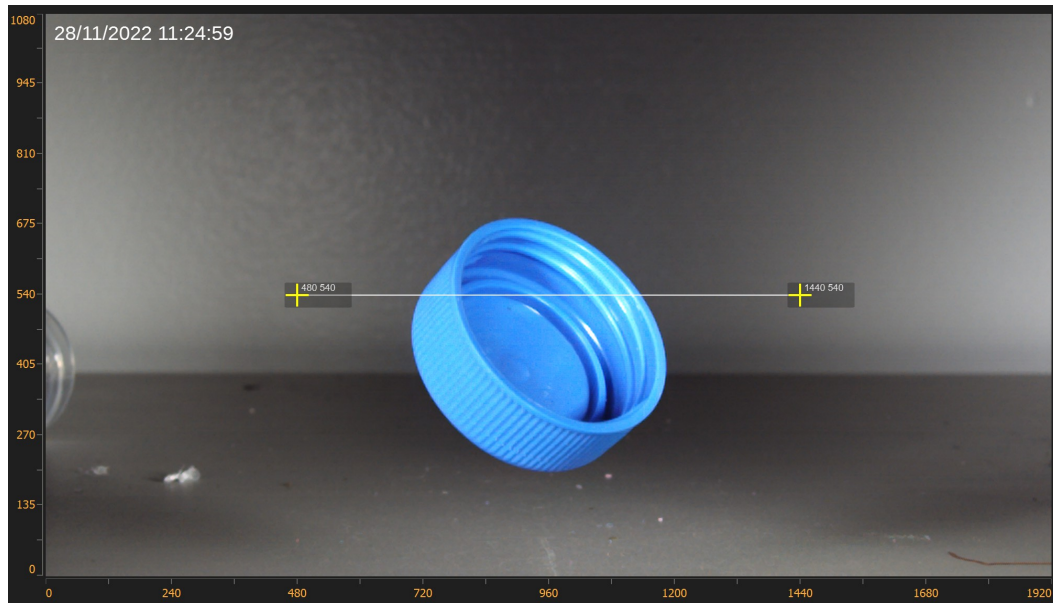
Angle

☐ Show targets.

Units: degrees Value: 70.8341

4.4.1. Distance

Enable “show target” in distance section and move the targets in the image. Distance is measured in pixels.



Show rulers: select this option to display rulers on left and bottom sides of the image.

Origin: select where the origin is located.

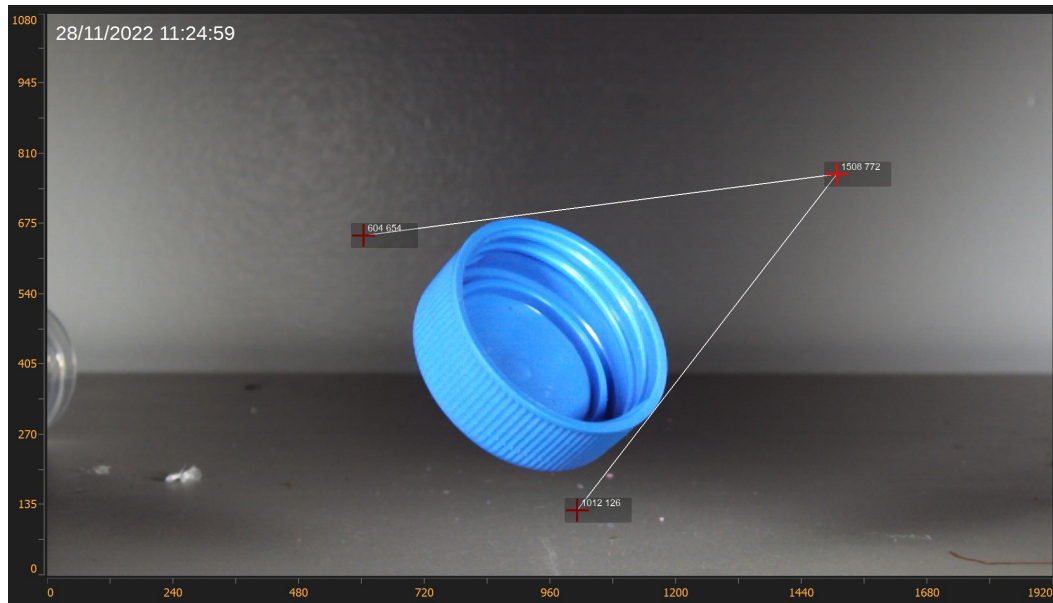
Units: units can be pixels or km, m, mm, us, inches and feet.

Value: it shows the calculated distance in the selected units.

Calibration is mandatory if units are not in pixels. To do so, move the targets, enter a known distance in mm and click “Calibrate”. Calibration can also be discarded.

4.4.2. Angle

Enable “show targets” and move three targets on the image. The angle is calculated and shown in one of the selected units.

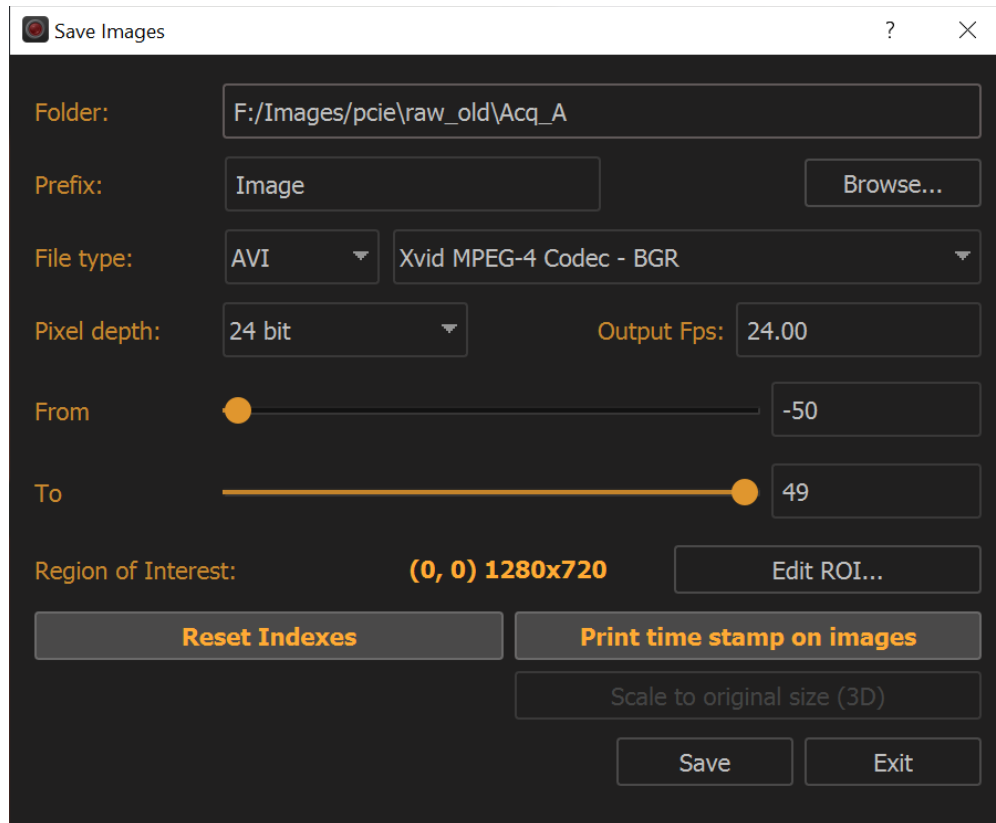


Units: select degrees or radians

Value: the value of the angles is calculated and displayed in the selected units.

4.5. Convert a RAW sequence

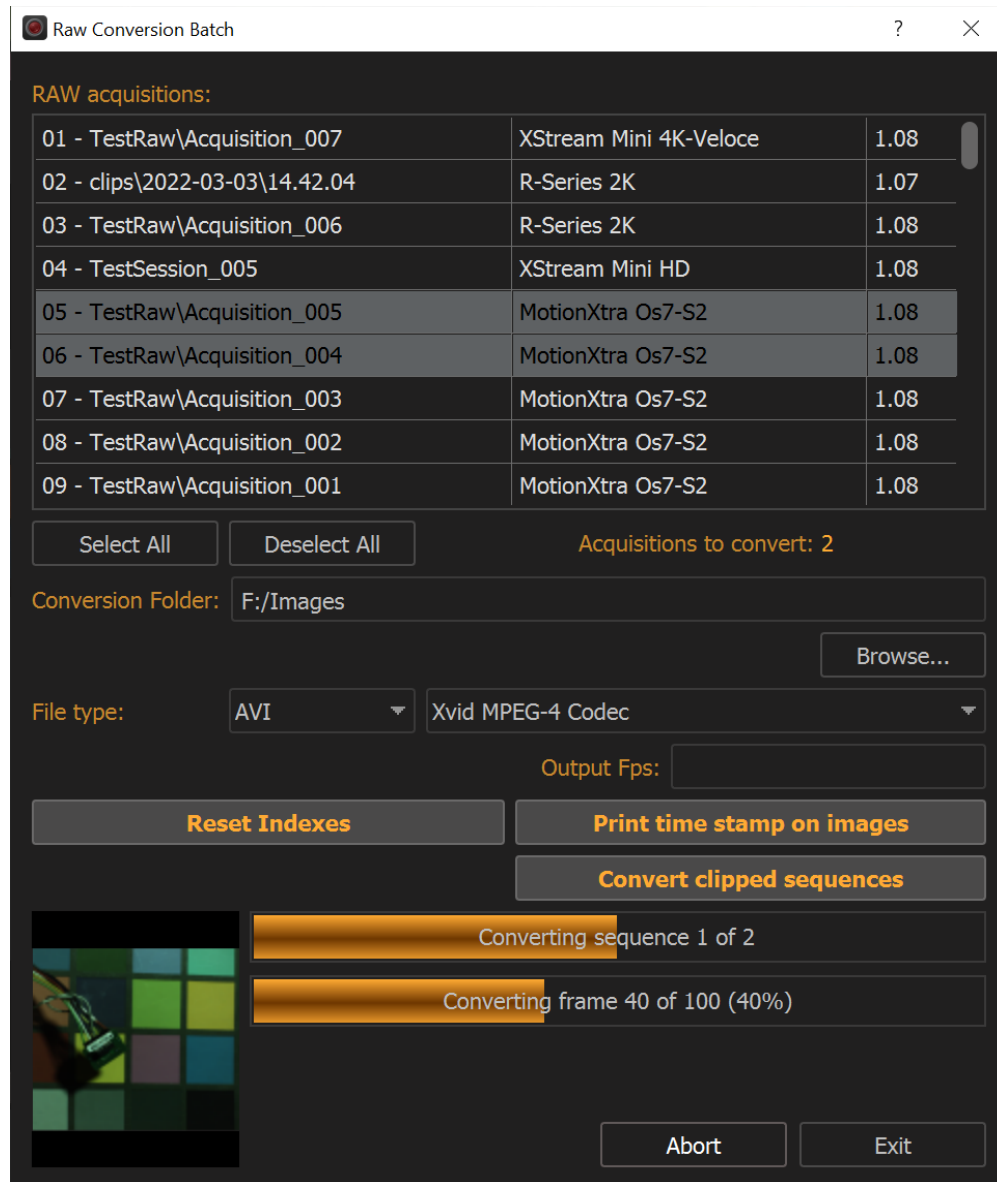
To convert a sequence, click the Save button.



- **Folder:** click Browse to change the folder where the images will be saved.
- **Prefix:** edit the image prefix.
- **File Type (TIFF, BMP ...):** select one of the file types.
- **Codec:** if selected file type supports codec (JPEG, AVI and MOV), “codec” dropdown list is enabled.
- **Output pixel depth:** if file type supports pixel depths above 8/24, images may be saved with them.
- **FPS:** select the output frame per second (AVI, MOV, MRF and MCF only).
- **From/To:** select start and stop indexes.
- **Reset Indexes:** if this option is selected, negative indexes are reset and started from zero.
- **Print time stamp on images:** if this option is selected, any time stamp info shown in playback is printed into converted files.
- **Scale to original size:** this option is valid only with 3D Raw sequences.

4.6. Convert in Batch mode

Click the batch icon located in the bottom gray bar to open the conversion batch window.



Tap on the sequences that you wish to convert and scroll the list to reach non visible sequences.

- Click “Select all” to select all the sequences in the database and “Deselect all” to deselect them.
- Click “Browse...” to change the destination folder.
- Select File type, codec (if available) and the other parameters.

- Select “Convert clipped sequences” if you want to convert only the images that have been selected in the viewer (start and stop sliders).
- Click Convert to start the conversion.

4.7. Open and convert a sequence of images

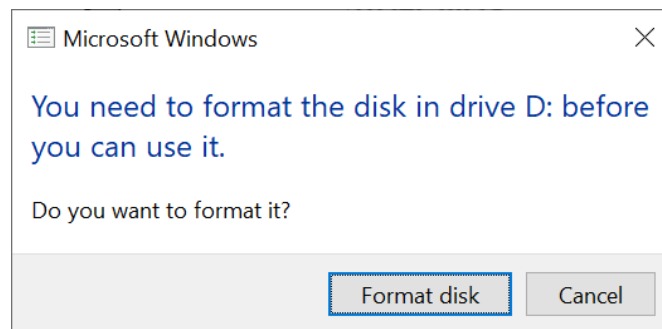
- Click on the “Image Files” icon in the main window.
- Click on one of the thumbnails and open a sequence.
- Use the slider and the playback controls to review the images.
- Click the “Disk” icon to save images in a different format.

4.8. Open and convert images from SSD/SD Card

This option requires that Motion Viewer is run with Administrative privileges in Windows and “root” privileges in MAC. Even if the operating system asks for that, DO NOT FORMAT the SSD/SD-card.

4.8.1. Windows

Connect the removable SSD/SD-card to a USB card reader and connect it to your local computer. Windows will ask to format it, answer No



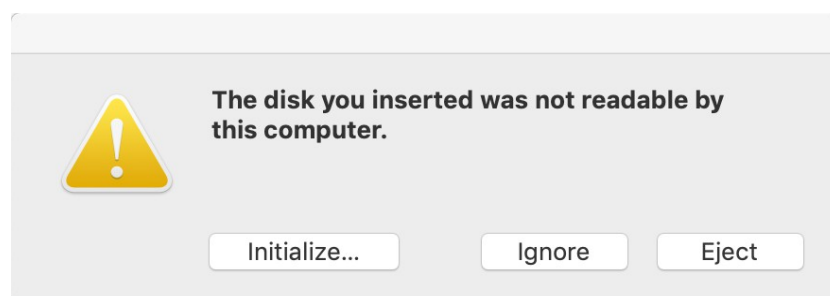
Open Windows explorer and locate MotionViewer.exe file in

“C:\Program Files\IDT\MotionTools”

Right click with your mouse and select “Run as Administrator”.

4.8.2. MAC

Insert the SSD or SD-card in a USB reader and connect it to your local computer. The operating system will detect a non-readable disk; if any message box will appear, press “Ignore”.



Open a terminal window and type:

```
sudo /Applications/MotionViewer.app/Contents/MacOS/MotionViewer
```

Then press enter. If Motion Viewer is installed in a folder that is not Applications, type the correct folder path.

The operating system will ask for your user account password. Type it and press enter.



4.8.3. Windows and MAC

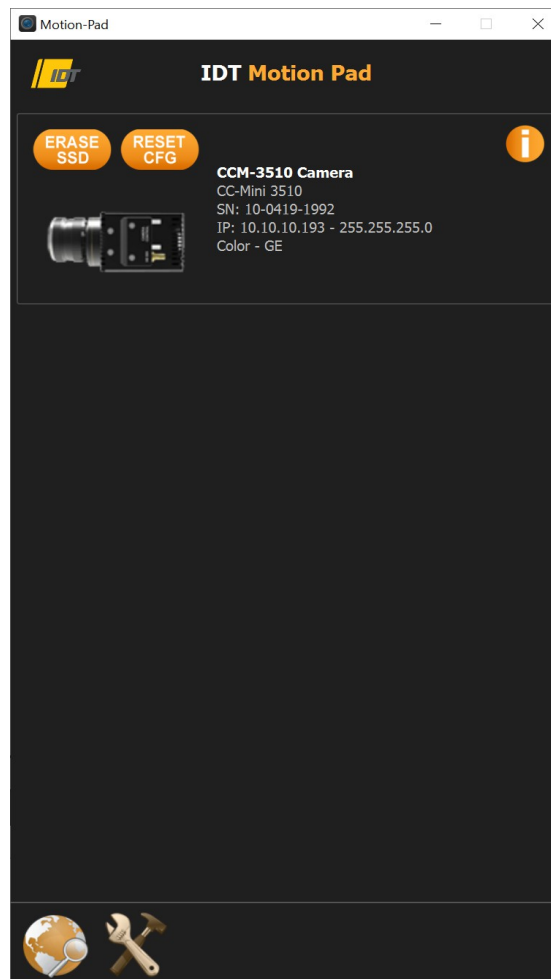
Once Motion Viewer is started, an icon with an SD-card or SSD appears in the left pane.

- Click on the “SD-Card” or “Removable SSD” icon in the main window.
- Click on one of the thumbnails and open a sequence.
- Use the slider and the playback controls to review the images.
- Click the “Disk” icon to save images in a non-raw format.

5. Motion Pad™

5.1. Overview

Motion Pad has been designed to control cameras in a very intuitive way. The software panels are especially adapted for operation with a small device such as an iPhone or an Android phone. Camera detection is the same as in Motion Inspector, detected cameras are shown in a list. Each camera configuration and SD-card can be reset before opening it. Also, more than one camera can be simultaneously open.



5.2. Edit camera name and IP address

Camera Information ×

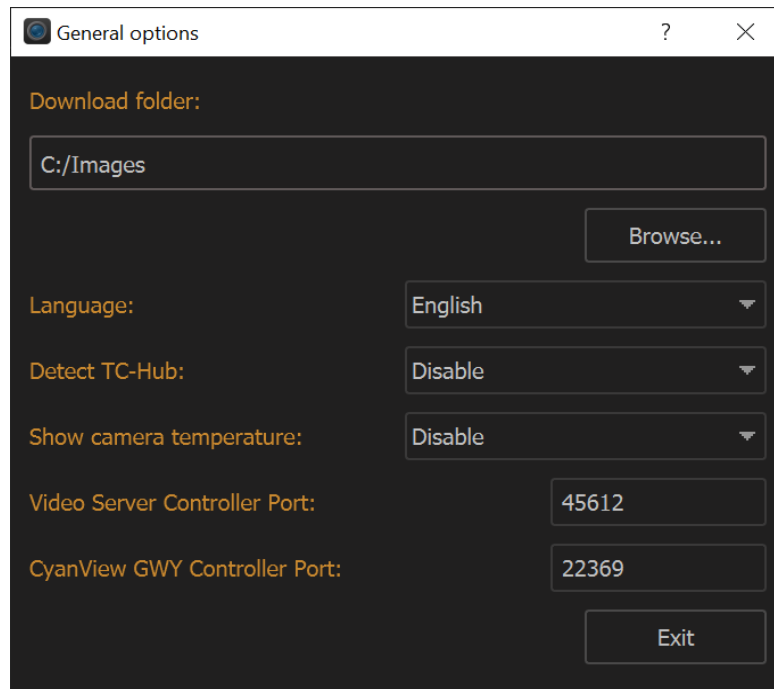
Name	CCM-3510 Camera
IP Address	10.10.10.193
Subnet Mask	255.255.255.0
Model	CrashCam Mini 3510
Serial Number	10-0419-1992
Color	Yes
Firmware Versions	227.231
DDR Size	7.84 GB
SSD/SD-Card Size	58.42 GB

Click the Info button on camera thumbnail, the above dialog box will appear.

Click on Name to edit camera name or click to IP address to edit Camera IP address.

5.3. Options

Motion Pad shares the download folder and the language selection with Motion Inspector. To activate the options, click the “tools” button on the bottom bar.



Download folder: select the folder where the images are saved.

Language: select the display language (English, German, Italian or Japanese).

Detect TC-Hub: automatically detect any TC-Hub in the same network of cameras.

Show camera Temperature: if this option is checked, the camera temperature is shown in a blue circle on bottom bar. Click or tap on the circle to switch the temperature units between Celsius and Fahrenheit.

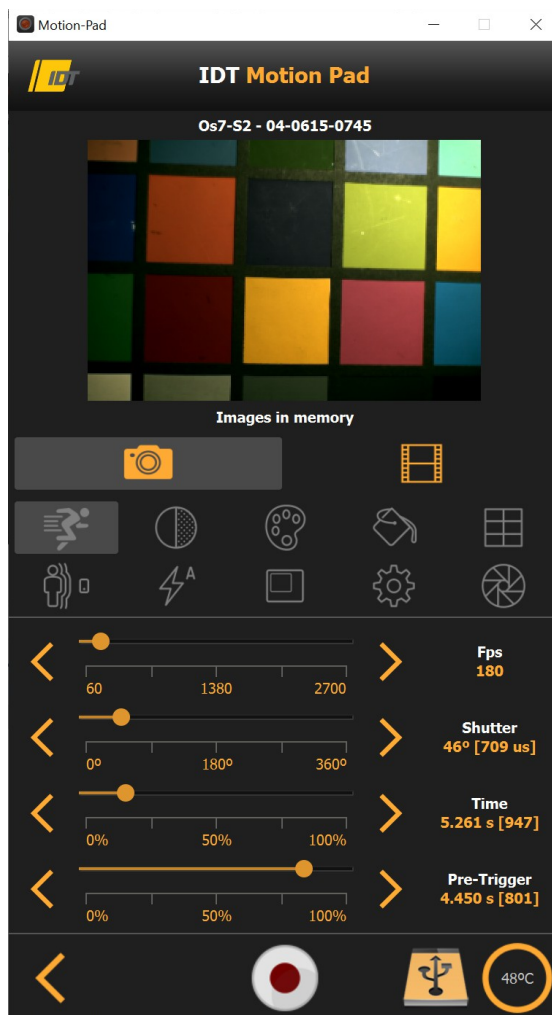
Auto defect correction: enable or disable automatic defect correction on cameras.

Video Server Controller port: select port number for communication with JLC Cooper SloMo controllers.

CyanView GWY Controller port: select port number for communication with CyanView GWY controllers.

5.4. Camera Operation

Once the camera is open, the main window shows the camera image preview and the selection of two panels, one for the camera operation, the other for the images playback and save.



Bottom bar buttons, from left to right are:

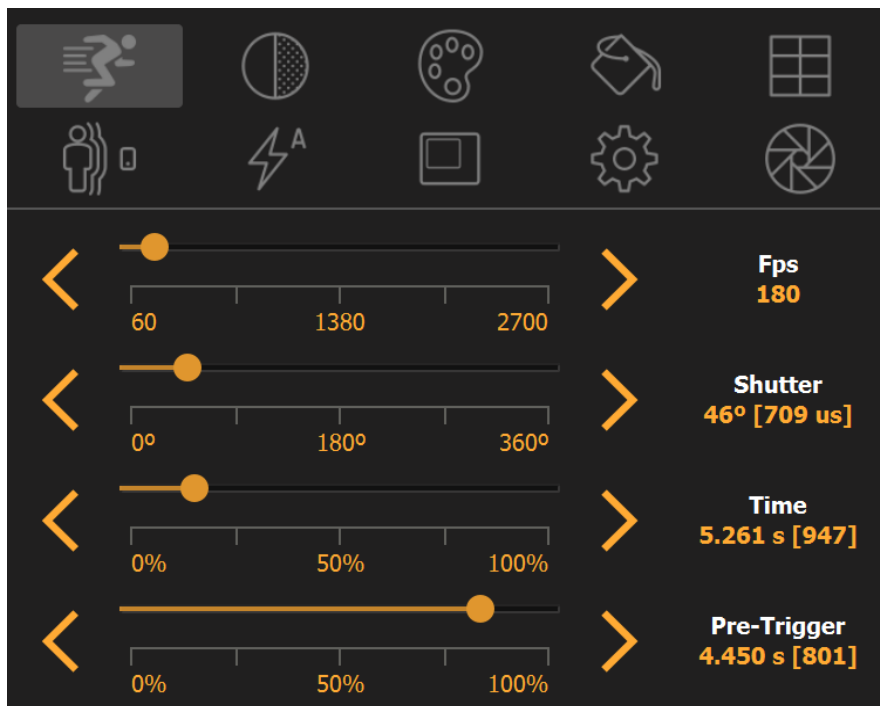
Back: return to the camera list page.

Record: click this button to trigger the camera or arm it. The button blinks if the camera is recording.

SD-Card/SSD: opens a dialog box that shows a list of acquisitions in camera SD-Card and the amount available space.

Camera temperature: click the button to switch between Fahrenheit and Celsius.

5.4.1. Record



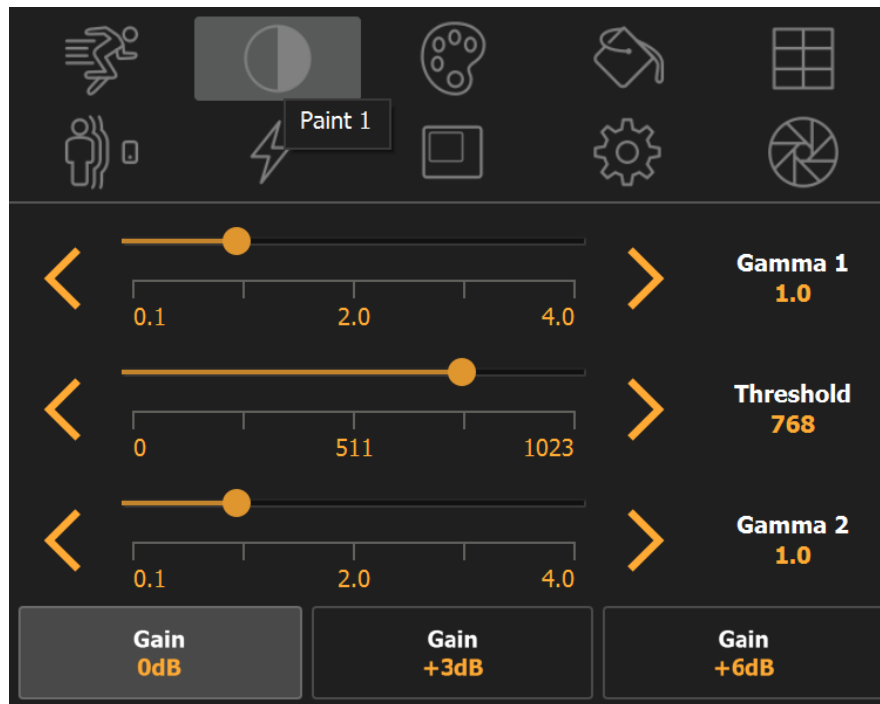
Fps: configure the camera frame rate. The value is set as a multiple of the SDI frequency configured in the options page (see below).

Shutter: configure the camera exposure. The value is shown in shutter angle (degrees from 0 to 360 and in microseconds. If you tap or click on the “Shutter” label, you can enter the value in microseconds with a key pad.

Time: configure the acquisition time. The value is shown in seconds and number of frames.

Pre-trigger: configure the pre-trigger time. The value is shown in seconds and number of frames.

5.4.2. Paint 1



Gamma 1: configure the lower gamma value.

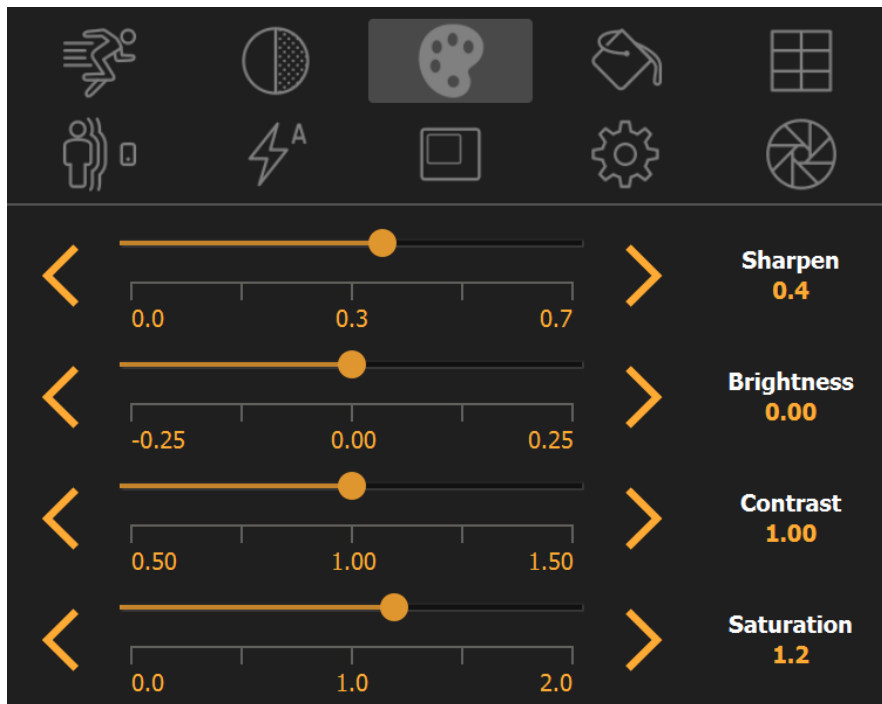
Gamma 2: configure the upper gamma value.

Threshold: configure the upper threshold level.

Gain: the camera sensor gain can be selected. Configurable values are 0dB, +3dB and +6dB (corresponding to 1.00, 1.41 and 2.00).

NOTE: Gamma is disabled if any look up table is selected.

5.4.3. Paint 2



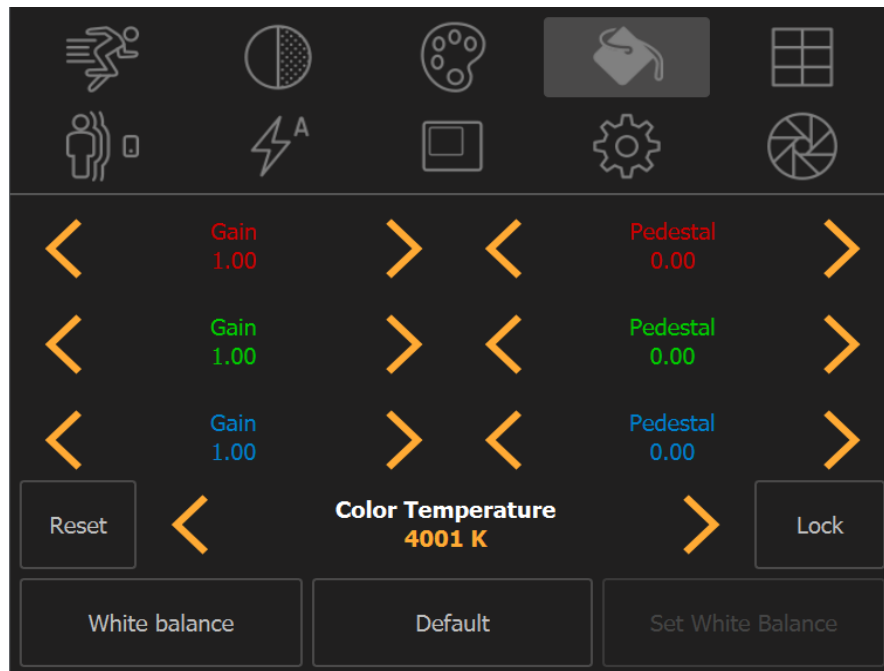
Sharpen: camera sharpening filter. The range is from 0 (no sharpening) to 0.7. Default is usually 0.2.

Brightness: edit image brightness.

Contrast: edit image contrast.

Saturation: color saturation range is from 0 (gray-scale) to 2. Default is usually 1.2.

5.4.4. White Balance/Gain/Pedestal



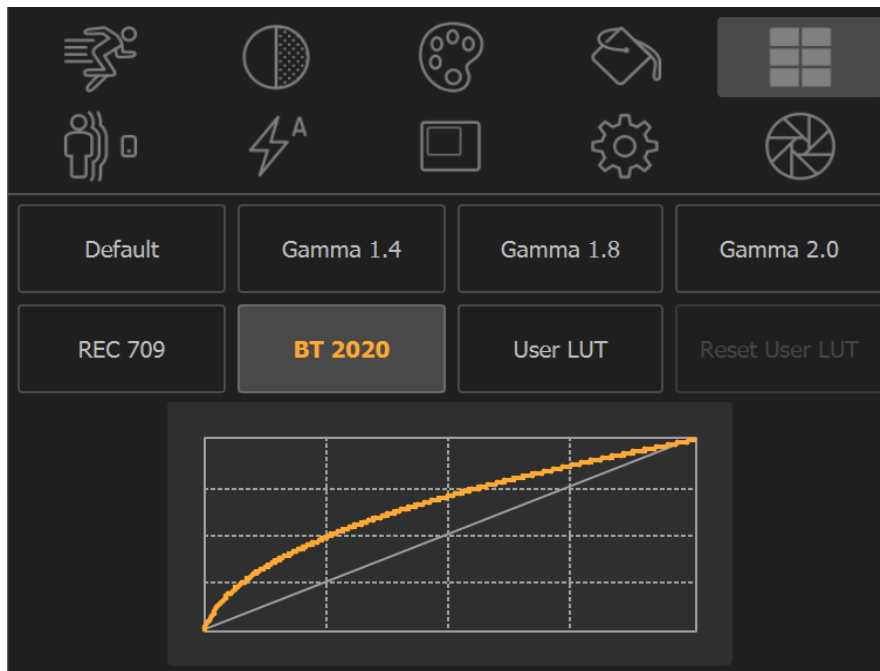
Reset G/P: click this button to reset gains to 1 and pedestals to 0.

Lock pedestals: select this button to lock pedestal sliders.

White balance: toggle between color temperature and white balance. if it's not selected, the user can operate color temperature controls, if it's selected, the user can do white balance (see below).

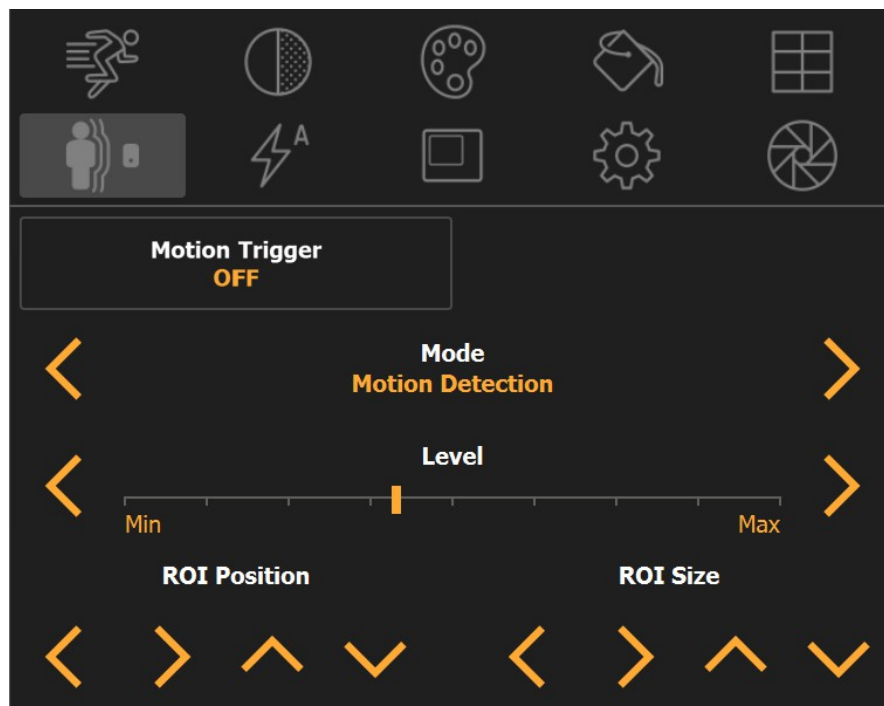
Set White balance: check this button and click on a gray area of the image to calculate white balance. The cursor will automatically turn into a cross.

5.4.5. Look Up Table



Select one of the preset look up tables or create a user LUT. When LUT is enabled, regular gamma is disabled. When LUT is disabled, regular gamma is on, and LUT graph shows gamma curve.

5.4.6. Motion Trigger



Motion trigger: this is a three state button (OFF, SET, ON). When the state is SET, the user can select parameters and test motion trigger condition. The area color changes from green to red when motion trigger condition is true.

Mode: select the detection mode (intensity change, intensity increase, intensity decrease, motion detection).

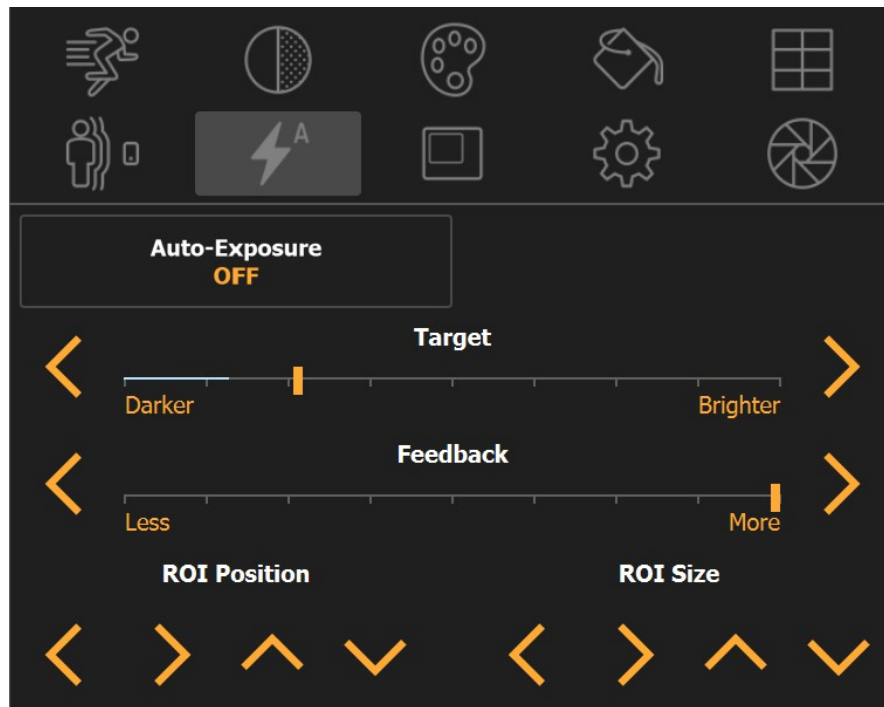
Level: select the detection level (less means more sensitive, more means less sensitive).

ROI position arrows: move the target left, right, top and bottom.

ROI size arrow: change ROI size.

NOTE: MT ROI can be also moved by dragging the green/red rectangle in the image.

5.4.7. Auto exposure



Auto Exposure: activates or deactivates auto exposure.

Target: select the desired average level. A progress indicator shows the current value on image.

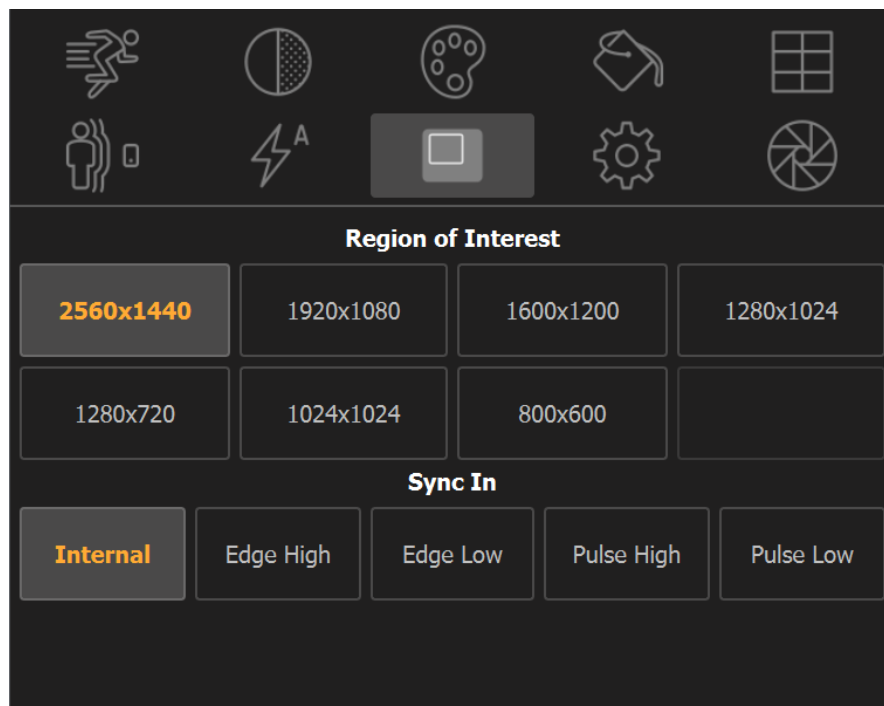
Feedback: select how fast the exposure change should be done.

ROI position arrows: move the target left, right, top and bottom.

ROI size arrow: change ROI size.

NOTE: AE ROI can be also moved by dragging green/red rectangle in the image.

5.4.8. ROI / Synchronization

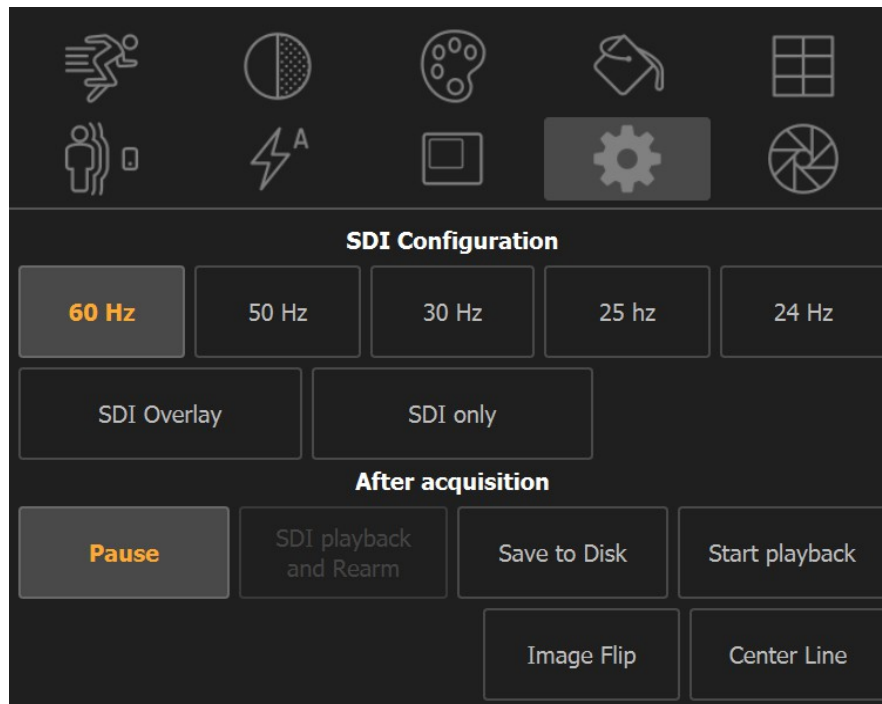


A list of region of interests supported by the camera is shown. Click on one of the buttons and the corresponding ROI will be selected.

The “Sync In configuration” panel controls the camera synchronization. If more than a camera is open the app automatically checks if there is a Master/Slave connection and sets the cameras to Master/Slave mode.

If more than one camera is on and a TC-Hub is detected, the app shows a “TC-Hub Synchronized” button. If the button is checked, the camera sync is generated by the hub and the user can select a phase delay.

5.4.9. Options



SDI configuration: if the camera has an SDI output, the frequency can be configured. Also, the SDI overlay can be enabled and disabled, and the output can be directed to the SDI only, to improve performance.

After acquisition: when images have been acquired the user has four options.

- **Pause:** do nothing.
- **Rearm:** plays back the images to the SDI and then rearms itself. This option is available on POV models only.
- **Save to Disk:** if the camera has an internal SSD or SD card support (and firmware supports this mode), the images are automatically saved to the disk.
- **Start playback:** playback starts automatically after images have been recorded.

Center line: a vertical line is shown in the middle of live image.

Image Flip: flips the image around the central vertical axis.

5.4.10. Lens

Some IDT camera models have motorized lens support (O-series).

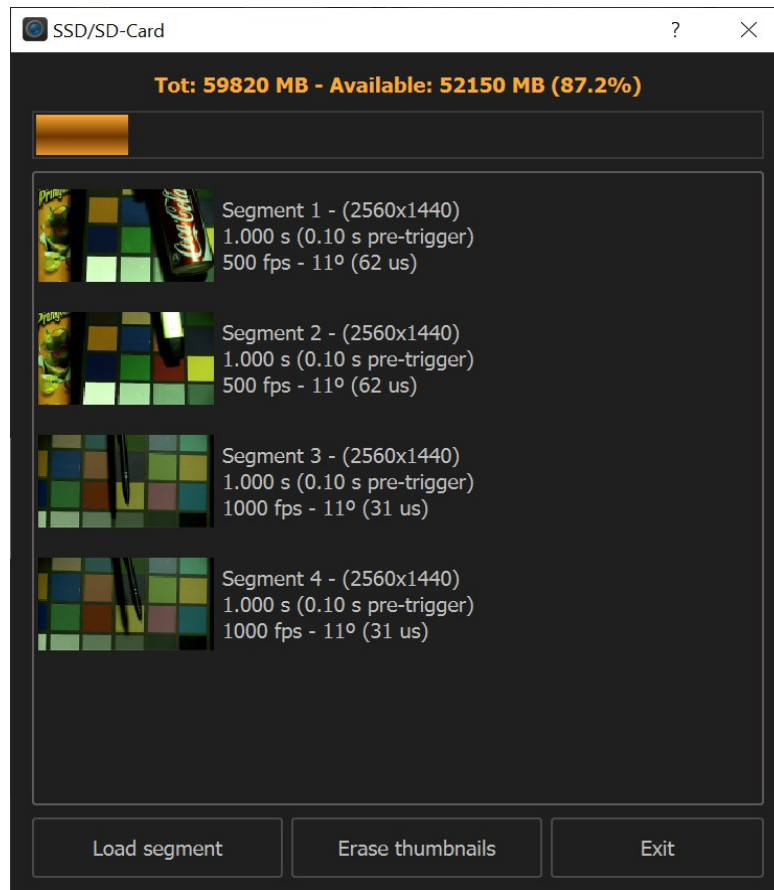
Focus: controls the lens focus.

IRIS: controls the lens aperture.

Zoom: control the lens zoom. This control is disabled if the lens has manual zoom or is Prime.

5.5. Load segments from SD-Card/SSD

If a camera has on-board SD-card (CC-Mini) or SSD (Os and O series), acquisitions can be loaded into camera memory.

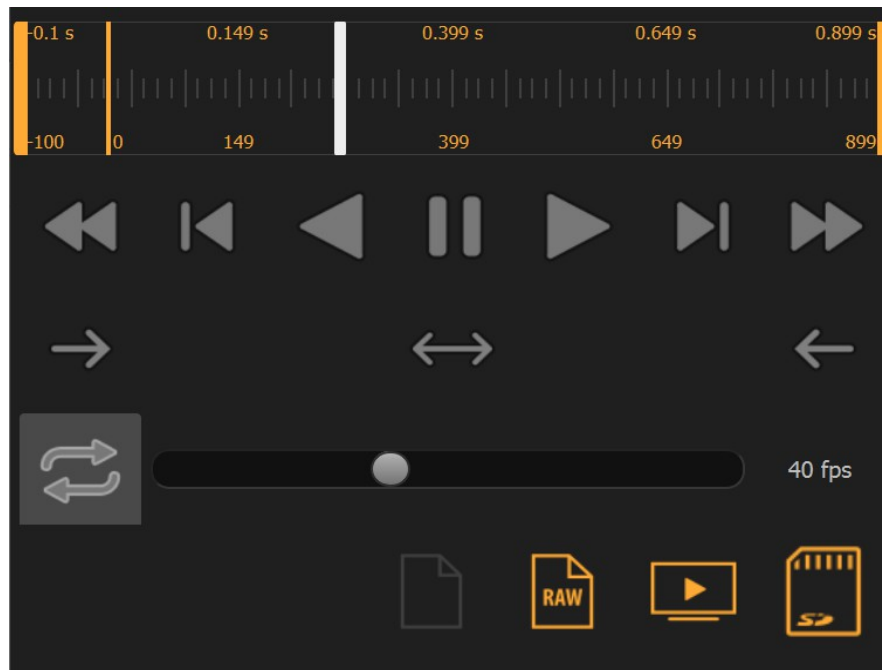


Load segment: select a segment from the list and click "load segments" to load it to camera DDR.

Erase thumbnails: thumbnails of segments are stored on the local computer. Click this button to erase them.

5.6. Playback and save

5.6.1. Playback controls



Each acquired sequence can be played back in both directions and frame by frame. The playback speed can be controlled with the speed slider (fast forward and rewind).

5.6.2. Save images

Images can be saved in different formats:

Compressed: images can be downloaded in the compressed format supported by the camera firmware (JPEG for Os/CC and H264 for CC-mini). If the camera doesn't support any compressed format, the button is grayed out.

RAW: save the acquisition in RAW format.

SDI: some SDI monitor have the capability to store a video. Click the button to playback the images to the SDI monitor at the configured frequency.

SSD: if the camera has on-board SSD or SD-Card, the acquisition can be manually saved.



6. Motion tools for Apple iPad/iPhone/iPod™

6.1. Overview

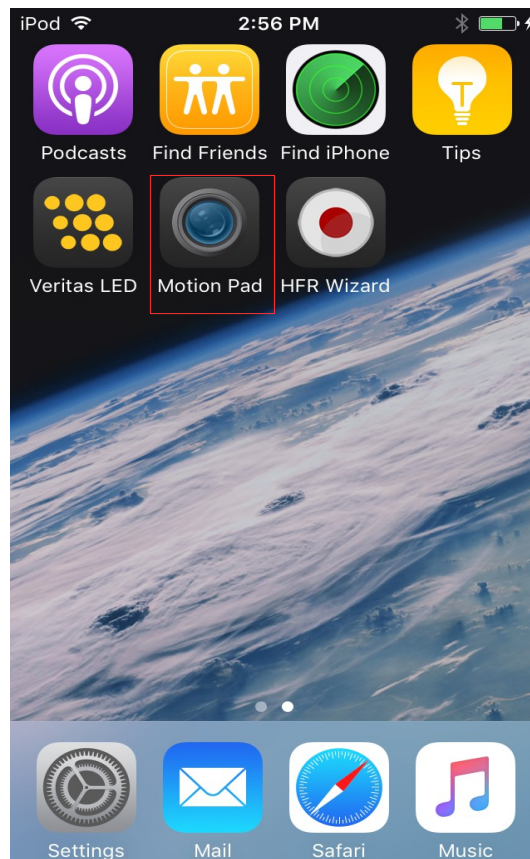
Motion Inspector and Motion Pad for iOS are Wi-Fi/Ethernet apps available on the iTunes store for iOS 8 and newer. They provide a wireless keypad to control the IDT Giga-Ethernet cameras. The software interface resides on the Apple device and provides control of the camera independent of a computer, insuring maximum portability.

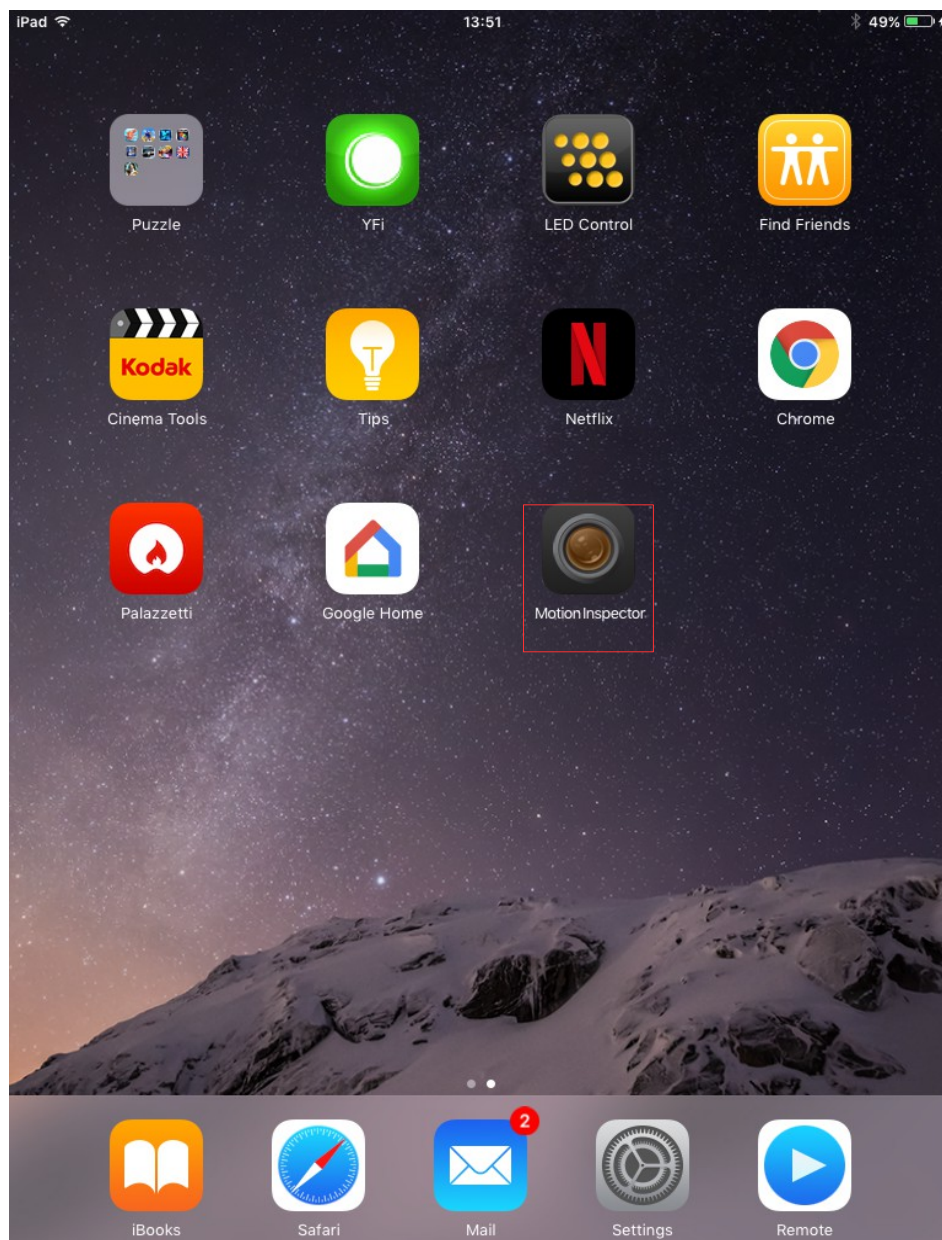
The camera models that are supported by the apps are listed in the topic 2.2 of this manual.

6.2. Installing the App

The software interfaces are free for download at the iTunes store. They may be downloaded via iTunes or directly from your iPhone/iPad. To do that, open the “App Store” and search for “Motion Inspector” or “Motion Pad”.

Follow the on-screen instructions and install the app. After the install, the icon “Motion Inspector” (and/or Motion Pad) will appear on your iPad/iPhone (see below).



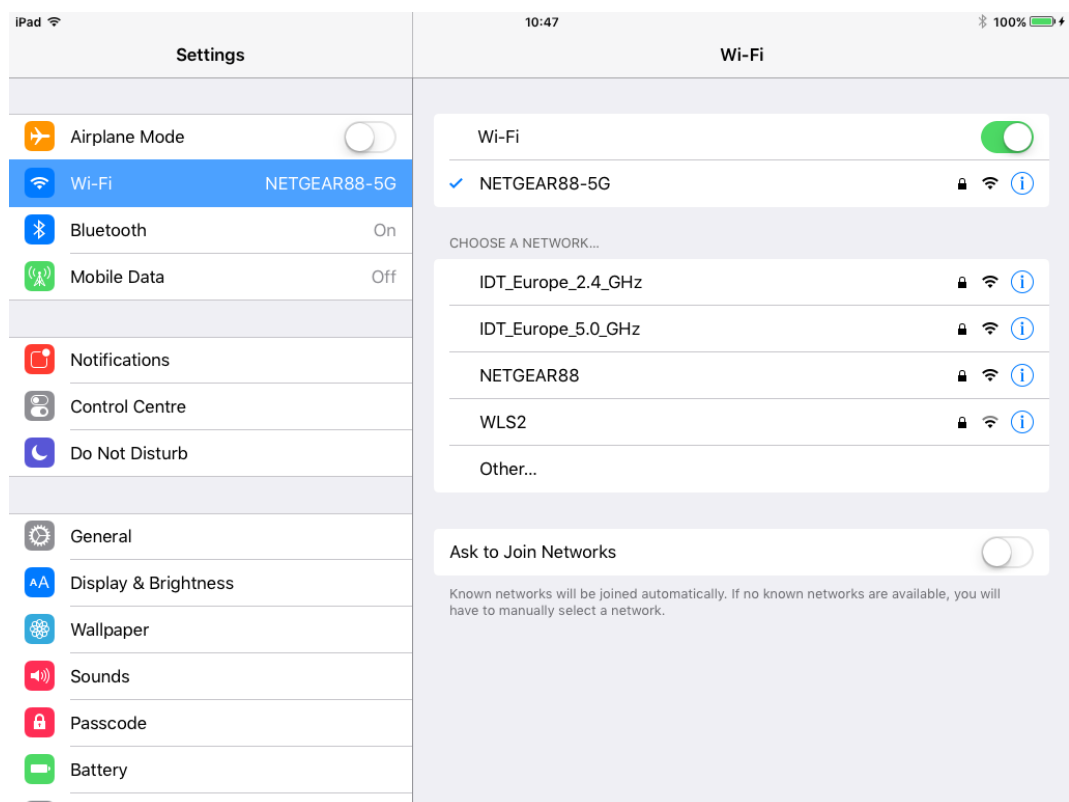


6.3. Application setup

Upon the installation of the app, follow the instructions below to start the communication between the iPad and the camera:

- Connect the camera to one of the Ethernet sockets of a Wi-Fi Access Point.
- Power up the camera and wait until the back “Status” light is green.
- Open the iPad settings and select the Wi-Fi page.

Make sure that the Wi-Fi Access Point is visible in the Network list and choose it (enter a password if required). Better if the Wi-Fi connection is 5 GHz.



6.4. Camera Controls

The user interface is similar to the Windows and MAC versions of Motion Inspector.

The top and bottom buttons control the camera parameters (Exposure, frame rate, resolution, color balance...) while the record button sends a trigger to the camera and acquires the images.

The iOS interface of the Motion Pad is the same as Windows version. For more information about operating cameras with Motion Pad, please refer to chapter 5.

6.5. Download Images with MI

Once the images are acquired the playback page is open.

- Click the bottom bar arrow buttons to playback the images.
- Use the black and white handle to navigate in the images sequence.
- Use the Orange handles to select the start and stop frames.
- Click the Disk button to save the images in RAW format or output the images to the video output (HDMI or SDI) at the max possible speed (up to 60 fps).

6.6. Download the images with MP

The procedure of downloading images from Motion Pad is described in topic 5.4 (Playback and save).

6.7. Transfer images with iTunes

Once the images are saved in RAW or JPEG format to the iPad/iPhone, they may be transferred to the MAC with the “File Sharing” tool of iTunes.

- Run iTunes.
- Click on the phone icon on the title bar and select the correct device from the list.
- Scroll down to the “File Sharing” icon and select “Motion Inspector” or “Motion Pad”.
- A list of the acquisition folders will appear in the right pane. Each folder name contains the date and the time when it has been created.
- Select a folder, click the “Save to...” button and select where the images will be downloaded.

