Optronis

CamRecord-
Runner Systems

User Manual

Ref.: 1950-SU-02

About this manual

Thank you for using an Optronis product.

Please read this manual thoroughly before installing and operating your new camera system for the first time. Follow all instructions and observe the warnings.

CamRecord-Runner systems consist of the camera, a controller and software installed on the controller. This manual describes the system to allow its configuration, setup and first operation. For further details, please refer to:

TimeViewer software manual

CamPerform-Cyclone camera manual

All manuals are available on the USB stick. The documents is subject to change without notice and corresponds to the last camera firmware and TimeViewer software versions.

Support

In case of any further question or if you wish to claim a service or warranty case, please contact your local dealer or refer to the Optronis support on our website or by email. Important: Your request must include:

- Serial-Numbers
  Camera S/N: « 1200-xx-xxx » See label at camera bottom side
  Controller S/N: « 1950-xx-xxx » See label at controller rear side

- TimeViewer software version

- Operating System (Windows 7/10/32bit/64bit …)

- Short but complete description of the problem

Contacts

To contact us, please use below information.

Address	OPTRONIS GMBH Ludwigstr. 2 D-77694 Kehl Germany Tel.: +49 (0) 78 51/91 26-0 Fax: +49 (0) 78 51/91 26-10
Website	http://optronis.com/en/
Contact Form	https://optronis.com/en/contact/
General Inquiries	info@optronis.com
Sales	sales@optronis.com
Support	support@optronis.com

Contents

Scope of Delivery

Typically, CamRecord-Runner systems are provided with these components:

> CamPerform-Cyclone series camera
>
> with F-Mount (CP-FM) and heat sink (CY-HIS)
>
> Controller-RC1
>
> with power supply and TimeViewer software
>
> 4x 3 m CXP cable
>
> USB stick with manuals
>
> Quickstart instructions manual
>
> Transport case

Options

> C-Mount (CP-CM), FMG-Mount (CP-FMG)
>
> CXP cable up to 40 m
>
> Fan (CY-FAN)
>
> Pig tail cable for synch (CPH6-PTC), trigger adapter (CR-TAR)
>
> Manual trigger (CR-HTR), memory extension (Mem-56GB)
>
> Programmer Guide (download, free of charge)

Safety Instructions

- Operate CamRecord-Runner system with the power supply provided with the system and from a 110 Volt to 240 Volt, 50 Hz to 60 Hz power source. Other voltage levels or frequencies may damage the camera.

- Do not orientate the optical input of the camera to direct sunlight or intense laser light.

- Keep the camera protected from dirt, dust, grease and water.

- Make sure that all the connecting cables are in good condition and that they are well mounted to their sockets.

- Please use the socket of the camera and connect it to a sufficiently stable basis.

- Avoid strong shocks and vibrations during transport or operation.

- Always unplug the camera before cleaning it. Do not use cleaning liquids or sprays. Instead, use a dry and soft duster.

Concept

Hardware

The CamRecord-Runner systems combine these key components:

- Camera (CamPerform-Cyclone)
- Controller integrating a grabber, TimeViewer software, operating system and memory
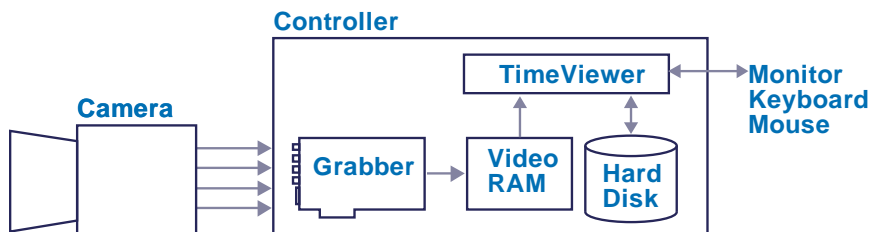

Figure 1: Basic concept of CamRecord-Runner systems

As various CamPerform-Cyclone cameras can be used, CamRecord-Runner systems are available with different combinations of frame rate and resolution. CamPerform-Cyclone camera is connected to the controller via CoaXPress interface for data transfer and power supply. The controller, integrating a frame grabber, video memory and software is common to all systems. For operation in basic configuration, external keyboard, mouse and monitor are needed.

The controller is configured in order to provide best performance for image capture and storage. Although PC based, the controller is intended to be used as camera controller only. Any hardware or software modification by used must be done carefully, to avoid impact on system performance. Optronis does not recommend making any changes to either the hardware or the software.

It is well possible to use more than one CamPerform-Cyclone camera, one after the other with the same controller.

Software

Knowledge about structure of software components is of minor importance as long as the system is operated in its basic system setup. For setups with remote PC operation to control the system or for setups with multiple cameras, understanding the software structure will be helpful.
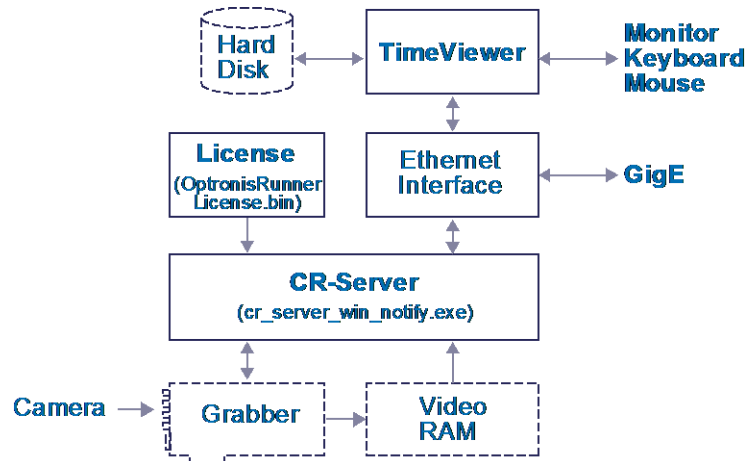
Figure 2: Software structure of CamRecord-Runner systems

Central part of the controller is the CR-Server (cr_server_win_notify.exe). Together with the license file (OptronisRunnerLicense.bin) and the frame grabber these components are belonging together and must not be separated. They provide access to the camera and control storage of video data on the video RAM memory. TimeViewer software communicates with the CR-Server via the Ethernet interface either on the same computer or via physical GigE network. TimeViewer saves project and video data on hard disk and provides the user interface.

CR-Server is configured to start automatically after controller powering up. TimeViewer needs to be started by user.
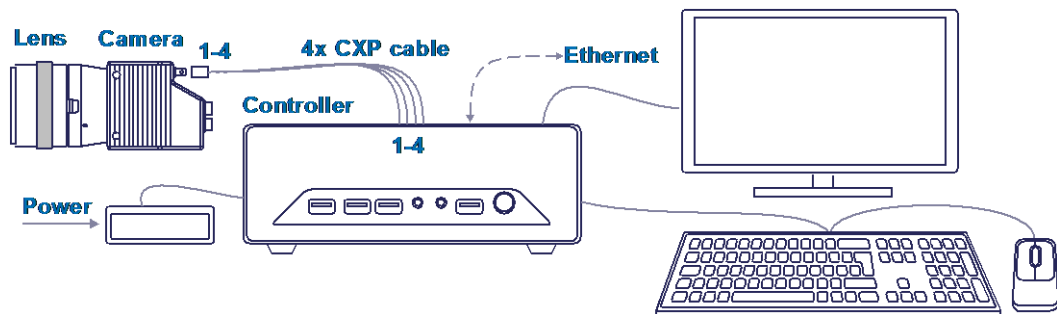
Installation

Basic system setup

Figure 3: Basic system setup (physical connection)

1. Connect the power supply to the controller

2. Connect 4x CXP cables from controller to camera

3. Install lens on camera

4. Connect monitor, keyboard (English) and mouse to controller

5. Switch on controller

Of course, connection of controller to camera and power supply remains unchanged for other system setups. The basic system setup can also be presented as logical schematics as shown on the figure below.
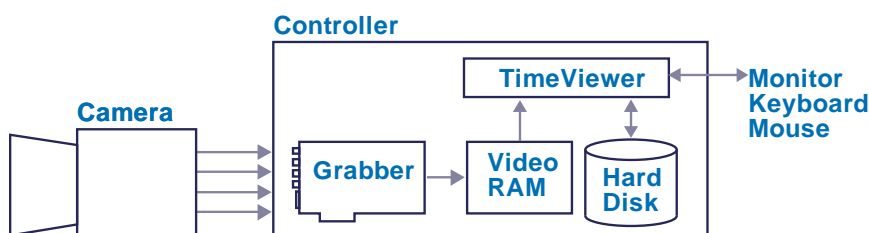

Figure 4: Basic system setup (logical schematics)

System setup with remote PC

Instead of using TimeViewer on the controller itself, it is possible to install TimeViewer software on a separate computer and control the CamRecord-Runner system remotely via Ethernet interface.
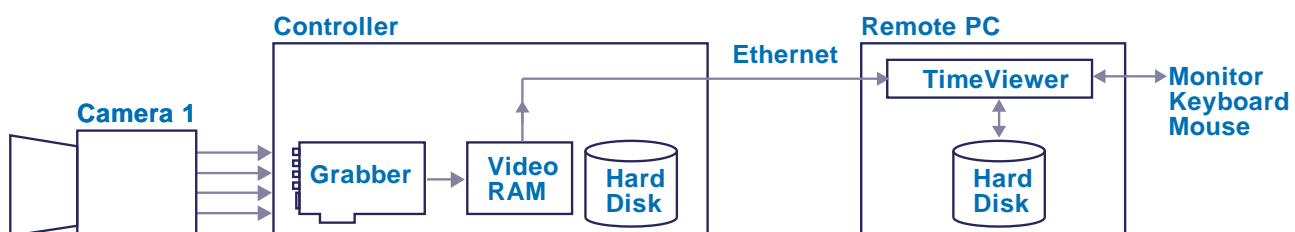

Figure 5: System setup with remote PC (logical schematics)

To allow communication between controller and remote PC both Ethernet adapters need to be on the same subnet. As CamRecord-Runner controller is factory set to obtain IP address automatically, it is necessary to change adapter settings on the controller. Windows allows to change adapter settings. Therefore, monitor, keyboard and mouse need to be connected to the controller during controller settings change.

Controller settings:

1. Navigate to the adapter settings of the Ethernet interface to be used for remote control.

2. Set IP address for example to 192.168.100.254 and subnet mask to 255.255.255.0
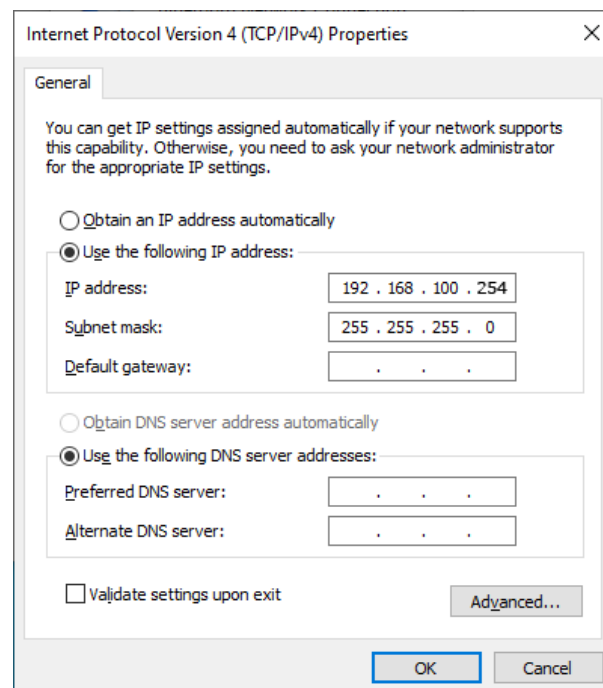
3. Confirm with OK

4. Make sure TimeViewer is not active on the controller.

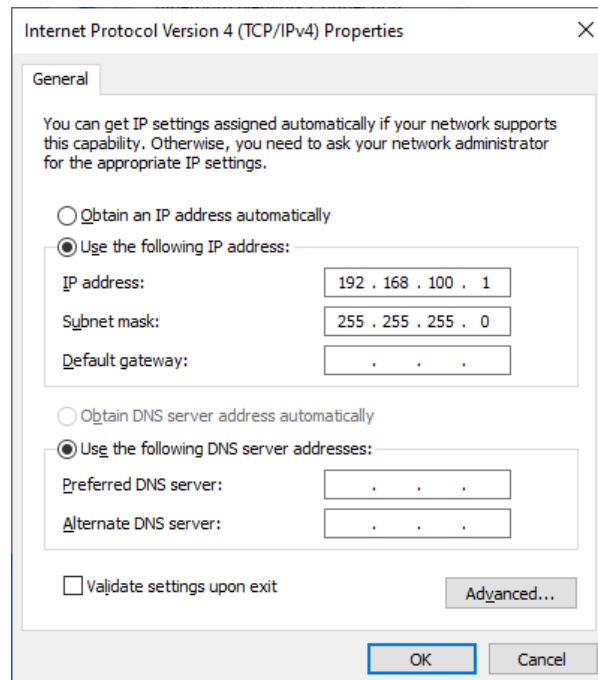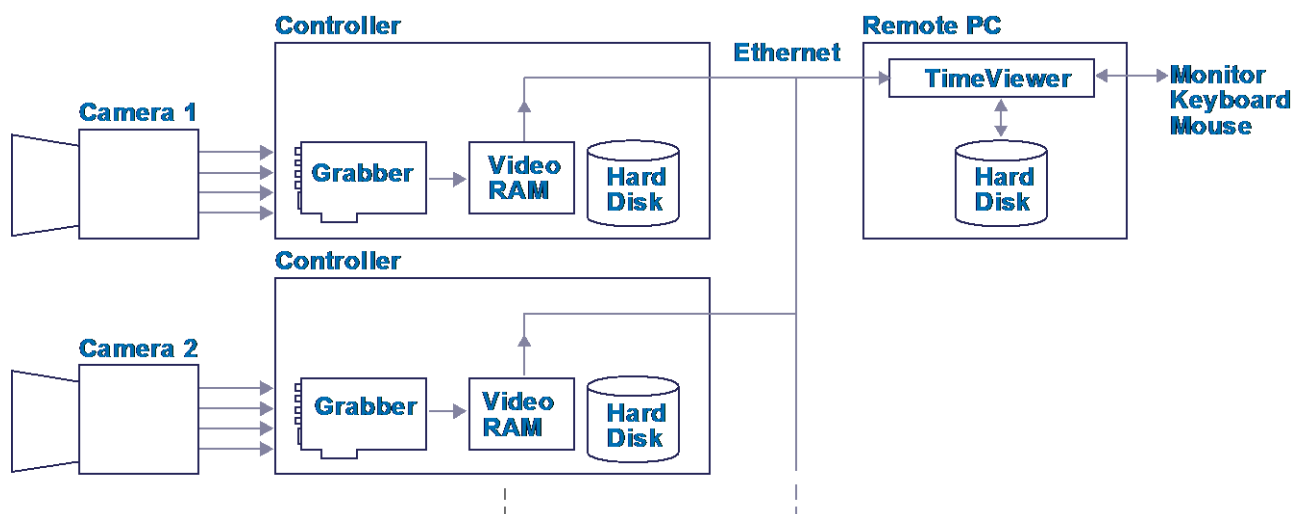5. Keyboard, mouse and monitor can be removed

Remote PC settings:

1. Navigate to the adapter settings of the Ethernet interface to be used for remote control.

2. Set IP address for example to 192.168.100.1 and subnet mask to 255.255.255.0

3. Confirm with OK

Multi camera system setup

Multiple CamRecord-Runner systems can be controlled by the same remote PC.

Figure 6: System setup for multiple cameras with remote PC (logical schematics)

Similar to the setup when using one camera with a remote PC, all Ethernet adapters need to be on the same subnet.

1. For controller setting of camera 1 and remote PC, proceed as described on the "System setup with remote PC" above.

2. For controller setting of camera 2, navigate to the adapter settings of the Ethernet interface to be used for remote control.

3. Set IP address for example to 192.168.100.253 and subnet mask to 255.255.255.0.

4. For controller setting of further cameras proceed as described on pos. 2 but use for example following IP addresses: 192.168.100.252, 192.168.100.251 and so on.

Attention:

IP address of all cameras must be different and different from IP address of remote controller.

Multi camera system setup without separate remote PC

In case no separate remote PC is used, it is possible to start TimeViewer on one of the CamRecord-Runner controllers.

1. Set IP address and subnet mask similar to the description on "Multiple camera system setup".

Custom controller (Controller-RC-Kit)

Custom controller means that PC is not provided by Optronis and consequently installation of hardware and software is done by user. This applies for installing the *Controller-RC-KIT*. It also applies in case the controller provided by Optronis is disassembled and particularly the frame grabber is reused in another PC. Any other case is not supported.

Please understand that controller settings and operation are no longer under Optronis control.

Hardware installation:

1. Install frame grabber
   Please refer to the manual of frame grabber and follow instructions.

2. Install frame grabber driver with standard options
   Please also refer to the manual of frame grabber manufacturer.

Software installation:

Necessary information for installation of software components provided by Optronis are described here. Prior to software installation, hardware installation should be completed and operating system Win 10, 64 bit is installed and working.

1. Install CR-Server
   Create directory: "C:\Program Files\Optronis\CR_Server\" (proposed location)
   Copy "cr_server_win_notify.exe" file from USB stick to the directory created before.
   Copy "OptronisRunnerLicense.bin" file from USB stick to the directory created before.

2. Add "cr_server_win_notify.exe" to the list of apps started with system boot (autostart)

3. Note MAC address (media access control address also called physical address) of controller as described on the "Connect - Connecting to CamRecord-Runner" section of the TimeViewer manual. This information is needed after installing TimeViewer. In case the non-standard controller is connected to a remote PC, MAC address is also needed to setup this PC.

4. Install TimeViewer 64bit version

5. Create MAC.txt on the folder containing TimeViewer.exe
   Details are described on the "Connect - Connecting to CamRecord-Runner" section of the TimeViewer manual.

System operation

CamRecord-Runner system is mainly controlled by TimeViewer software. Please refer to corresponding manual for details about this software. For first time operation, this procedure will help to use the system in a basic configuration.
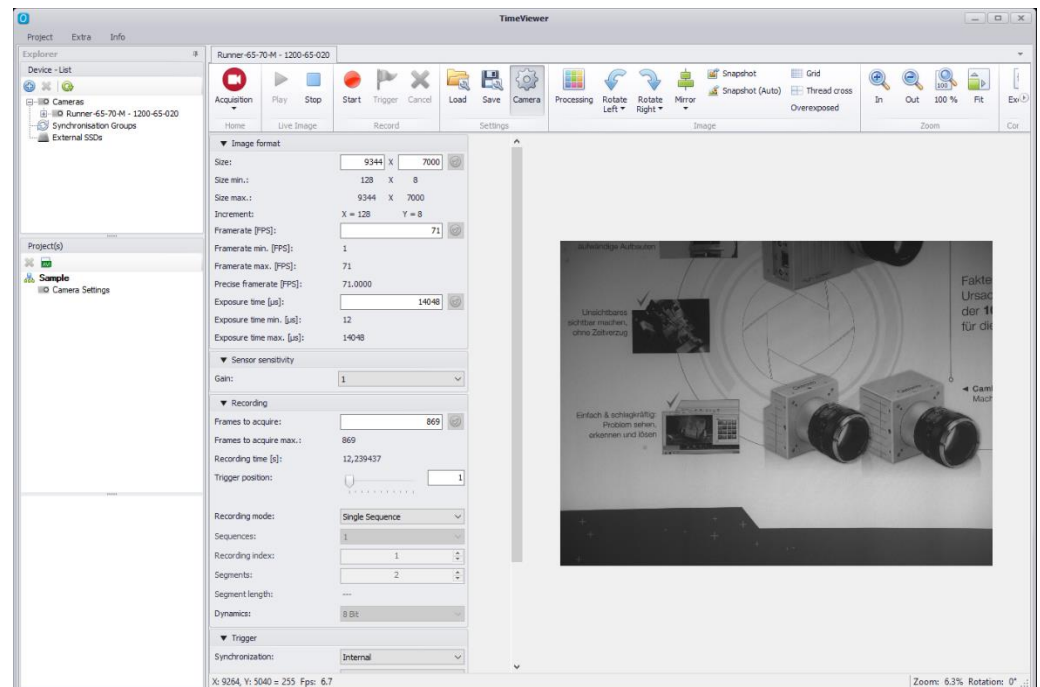
1. Start TimeViewer software
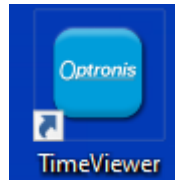

2. Open a new project
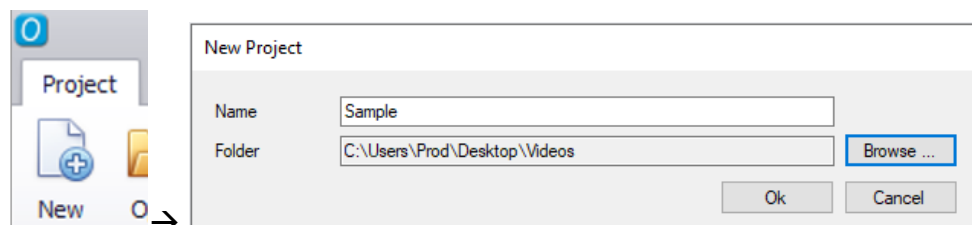
and confirm with OK.

3. TimeViewer will start and show a live image

Lens focal and aperture, frame rate, exposure time and illumination might need to be adjusted to your requirements.

4. Set recording length and trigger. For example, use Synchronization: "internal" and Trigger source: "software" to allow triggering by keyboard.

▼ Trigger

Synchronization: Internal
Trigger Source: Software
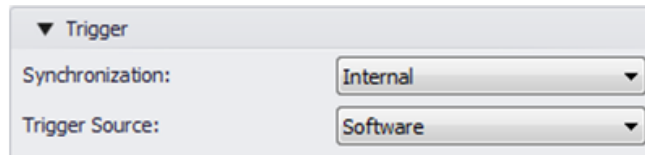
5. Initialize recording

Start

It will take some moments to allocate memroy and it might take some time to fill memory if post-trigger mode is used. Once completed, "Waiting for Trigger" is shown.
For triggering and to capture a sequence, space bar can be pressed

Frame drops

Video data are transferred in real time from the camera to the frame grabber via CoaXPress interface. Transfer from grabber to memory is done via PCIe interface at high bandwidth. Excessive test showed that transfer bandwidth to memory is significantly higher than needed by real time transfer from camera to frame grabber. Nevertheless, due to interfering events on the controller, transfer to memory might be disturbed for a short moment causing single frames not to be saved on memory. This is called frame drop. Frame drops are considered to occur far less than 1 per 1 million frames.

Typically, no frame drop occurs and this is indicated by "Frame drops: 0" on the footage window.
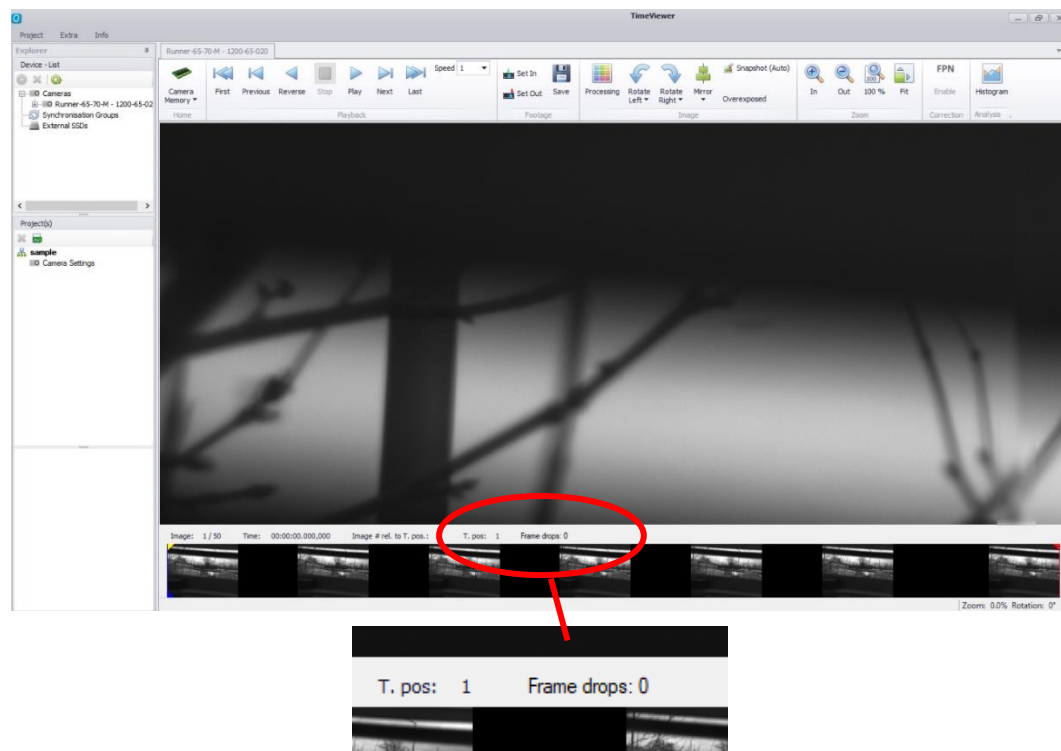

T. pos: 1   Frame drops: 0

Figure 7: Indication of no frame drop

In case of frame drops occur during recording, the number of frames on the footage is still identical to the number of frames to be captured. So, recording time had been longer by the number of frames dropped. After recording, the footage window shows the number of frames dropped in red color on the status line.

Figure 8: Indication if one single frame had been dropped

Stepping through the footage still indicates correct time when each frame had been captured. Consequently, frame drops cause a longer interval between consecutive frames.

Triggering

The saving image date to memory is initiated by triggering. Prior to trigger, recording had to be started. This continuously transfers frames into the ring memory. Once a trigger event occurred,

- frames might still be saved to memory until the ring memory is full (pre-trigger) or

- saving to memory is stopped immediately (post-trigger) or

- anything between pre- and post-trigger.

Trigger signal is applied to the trigger input on the controller.

Synchronization

Start of exposure of each frame can be synchronized to an internal or external signal. Typically, a fixed rate is programmed (internal) and frame rate is controlled by the internal clock of the camera. If the camera needs to be synchronized externally, the external signal has to be applied to the "Synch IN" on the camera. For details, please refer to the manual of the camera.

Technical Data

All camera models

Synchronization	Internal, External, CXP
Synchronization signal (external)	Synch IN, TTL level, electrically isolated Synch OUT, TTL level, electrically isolated
Dimensions (w×h×d)	98 × 65 × 71 mm³ (with CY-HIS)
Weight (typ.)	700 g (with CY-HIS)

Runner-1HS-3500

Camera	Cyclone-1HS-3500-M / Cyclone-1HS-3500-C
Sensor resolution	1,280 × 860 pixel
Frame rate min.	20 fps
Frame rate max.	3,500 fps @ 1,280 × 860 pixel : 275,000 fps @ 1,280 × 4 pixel
Recording time @ full resolution and full speed	6.7 s (24 GB) 15.5 s (56 GB)
Pixel size	13.7 × 13.7 µm²
Sensor diagonal	21.12 mm
Exposure time (min.)	2 µs
Temperature range (operation)	0 - 25°C (32 – 77°F) 0 - 35°C (32 – 96°F) with CY-HIS 0 - 50°C (32 – 122°F) with CY-FAN

Runner-2-2000

Camera	Cyclone-2-2000-M / Cyclone-2-2000-C
Sensor resolution	1,920 × 1,080 pixel
Frame rate min.	20 fps
Frame rate max.	2,100 fps @ 1,920 × 1,080 pixel : 156,000 fps @ 1,920 × 8 pixel
Recording time @ full resolution and full speed	6.7 s (24 GB) 13.5 s (56 GB)
Pixel size	10 × 10 µm²
Sensor diagonal	22.03 mm
Exposure time (min.)	4 µs
Temperature range (operation)	0 - 25°C (32 – 77°F) 0 - 35°C (32 – 96°F) with CY-HIS 0 - 50°C (32 – 122°F) with CY-FAN

Runner-5-700

Camera	Cyclone-5-700-M / Cyclone-5-700-C
Sensor resolution	2,560 × 1,916 pixel
Frame rate min.	20 fps
Frame rate max.	693 fps @ 2,560 × 1,916 pixel : 88,700 fps @ 2,560 × 8 pixel
Recording time @ full resolution and full speed	7.6 sec (24 GB) 17.7 sec (56 GB)
Pixel size	5 × 5 µm²
Sensor diagonal	15.99 mm
Exposure time (min.)	4 µs
Temperature range (operation)	0 - 25°C (32 – 77°F) 0 - 35°C (32 – 96°F) with CY-HIS 0 - 50°C (32 – 122°F) with CY-FAN

Runner-25-150

Camera	Cyclone-25-150-M / Cyclone-25-150-C
Sensor resolution	5,120 × 5,120 pixel
Frame rate min.	20 fps
Frame rate max.	150 fps @ 5,120 × 5,120 pixel : 20,900 fps @ 5,120 × 4 pixel
Recording time @ full resolution and full speed	6.6 sec (24 GB) 15.3 sec (56 GB)
Pixel size	2.5 × 2.5 µm²
Sensor diagonal	18.10 mm
Exposure time (min.)	12 µs
Temperature range (operation)	0 - 25°C (32 – 77°F) 0 - 35°C (32 – 96°F) with CY-HIS 0 - 50°C (32 – 122°F) with CY-FAN

Runner-65-70

Camera	Cyclone-65-70-M / Cyclone-65-70-C
Sensor resolution	9,344 × 7,000 pixel
Frame rate min.	20 fps
Frame rate max.	71 fps @ 9,344 × 7,000 pixel : 12,400 fps @ 9,344 × 8 pixel
Recording time @ full resolution and full speed	5.5 sec (24 GB) 12.9 sec (56 GB)
Pixel size	3.2 × 3.2 µm²
Sensor diagonal	37.36 mm
Exposure time (min.)	12 µs
Temperature range (operation)	0 - 25°C (32 – 77°F) 0 - 35°C (32 – 96°F) with CY-HIS 0 - 50°C (32 – 122°F) with CY-FAN

Controller-RC1

Video Memory	24 GB (opt. 56 GB)
Memory configuration	Ring memory
Trigger modes	Rising or falling edge, software, manually (CR-HTR), pre- and post-trigger
Trigger input	D-SUB HD 26p, fem. TTL
Hard disk	1 TB, SSD
Frame grabber	Euresys, Coaxlink Quad CXP-12 PCIe 3.0 (Gen 3) x8
Operating system	Win 10 pro, English
Dimensions (typ.)	205 × 270 × 80 mm²
Weight (typ.)	1.8 kg
Power Supply	100 – 240 V, 50 – 60 Hz
Interfaces	HDMI, 4x USB2, 4x USB3, GigE, D-SUB HD 26 for trigger input
Temperature range (operation)	0 - 40°C (32 – 104°F)

IP Configuration (factory set)

IP address: auto
Subnet mask: -

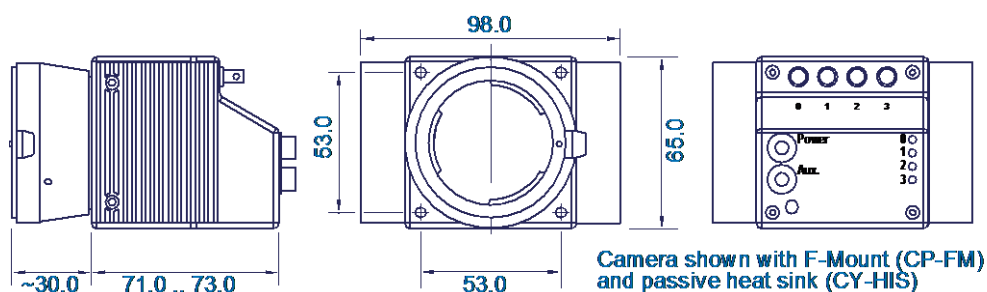| ℹ️ |
|---|
| In case of multi cameras setup used with the same PC, IP address of camera has to be different on the last number. Example: 192.168.100.254 and 192.168.100.253. |

Mechanical Dimensions
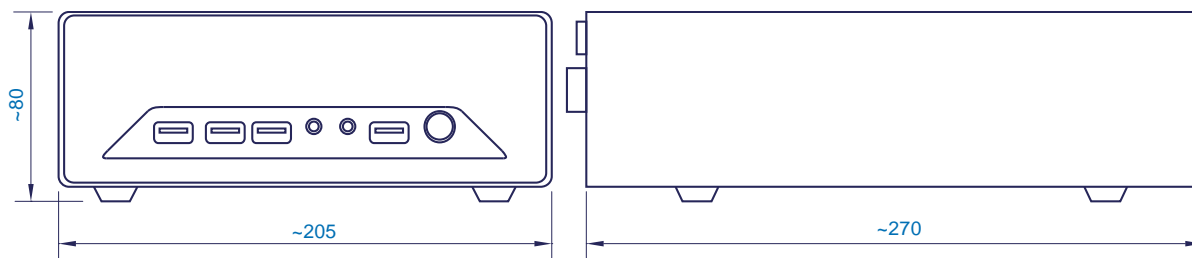

Figure 9: CamPerform-Cyclone camera
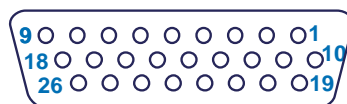

Figure 10: Controller-RC1

Trigger Input (Controller)

Figure 11: **D-SUB HD 26p, fem. connector**

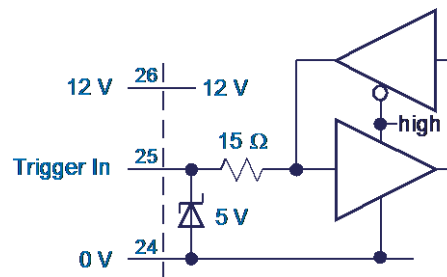| 12 V output	Pin 26	<1 A
Trigger In	Pin 25	0 – 0.8 V → low 2.0 – 5.0 V → high pulse width >100 ns
GND	Pin 24	

Figure 12: Trigger input schematics

Accessories

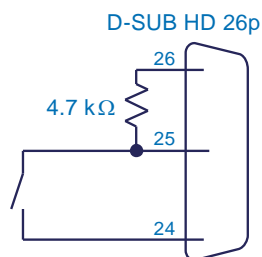### Manual trigger device (CR-HTR)

Figure 13: Manual trigger schematics

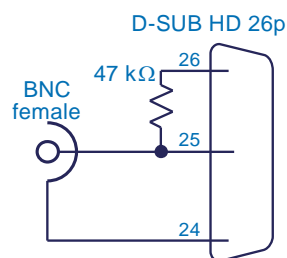### Trigger adapter (CR-TAR)

Figure 14: Trigger adapter schematics

Declaration of conformity

Manufacturer: Optronis GmbH

Address: Ludwigstr. 2, 77694 Kehl, Germany

We certify and declare under our sole responsibility that the following system consisting of:

CamPerform-Cyclone

Controller-RC1

Conforms with the essential requirements of the EMC Directive 2014/30/EU, based on the following applied specifications:

Specifications: EN 61000-6-3   Emission

EN 61000-6-1   Immunity

CamRecord-Runner systems are Pb free manufactured and RoHS compliant.

Kehl, 07.12.2021

Optronis GmbH

Dr. Patrick Summ

Managing Director

Revision

Manual revision	Date	Comments
1950-SU-02	07/12/2021	1st version