

HIGH-SPEED VIDEO CAMERA

CamRecord 600



Compact and easy
to use High-Speed
CMOS Camera with
FireWire^(R) interface

- ▶ High resolution 1280 x 1024
- ▶ 500 fps at full resolution
- ▶ FireWire^(R) interface
- ▶ Monochrome and color
- ▶ Up to 8 GB internal memory
- ▶ Full frame shutter
- ▶ 10 bit A/D conversion



Overview

The CamRecord 600 camera employs the latest CMOS sensor technology to provide high-speed monochrome (CamRecord 600) or color (CamRecord 600C) image sequences with outstanding image qualities. For frame rates up to 500 frames per second (fps), the spatial resolution of the image sensor is high (1280 x 1024 Pixel) and allows to acquire many image details simultaneously. To obtain higher frame-rates of up to 100 000 fps or to increase recording time, the spatial resolution of the sensor can be reduced.

CamRecord 600 and CamRecord 600C are offered in a compact design with integrated large video memory (up to 8 Gigabyte) and a standard FireWire[®] interface. This combination makes the camera easy to handle and enables the user to use any computing environment for the visualization and storage of the high-speed sequences.

Configurations

CamRecord 600	Camera with monochrome sensor
CamRecord 600C	Camera with color sensor

Video Memory

/1GB	1 Gigabyte
/2GB	2 Gigabyte
/4GB	4 Gigabyte
/8GB	8 Gigabyte



Fan without full-frame shutter



Fan with full-frame shutter

Functional Principle

The organisation of the video memory inside the camera offers maximum flexibility for the storage of a variety of different video formats and for the selection of the trigger position. The trigger position can be set either at the beginning, at the end or at any point inside the video sequence. For best trigger precision and flexibility in most applications, the camera accepts three different trigger sources: a manually induced trigger signal, a trigger signal coming from an external source and an automatic trigger signal generated by moving objects inside the Field of View.

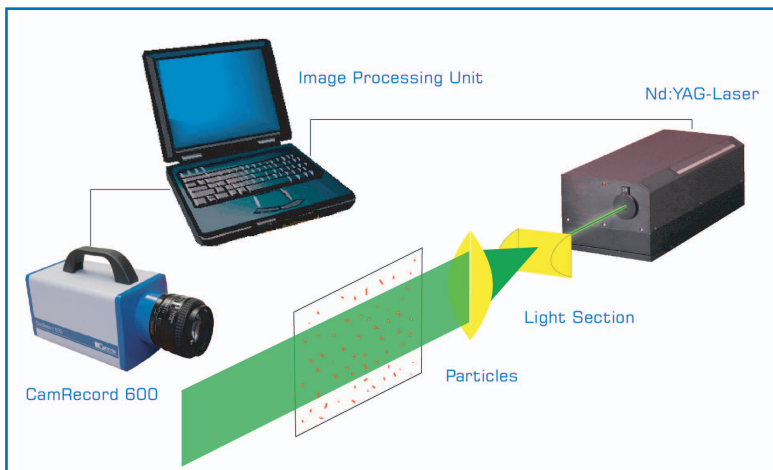
The on-chip AD-conversion technology of the image sensor guarantees high image quality with 10 bit (1024 grey levels) digitalization. This provides high contrast and allows to detect faint and bright objects simultaneously.

The camera offers a full-frame shutter with down to 1/1.000.000 second exposure time (1 μ sec), which freezes even the fastest movements and which eliminates all image artefacts known from other shutter technologies (as e.g. rolling shutter and frame transfer technics).

Applications

Among all common applications in industry, science and military as in-process inspection, in-process analysis and fault analysis, CamRecord 600 / 600C is also designed to meet consumer applications in e.g. entertainment, sports applications as well as special scientific applications. CamRecord 600 / 600C enables double exposure for particle imaging velocimetry (PIV) on simple and inexpensive PC hardware platforms. The camera has been developed to provide improved interframing times (~ 200 nsec) which cannot be offered by standard video cameras.

Together with high sensitivity (1600 bits / lux-second @ 550 nm), high image quality and high performance, the camera is used for high-end industrial metrology as well as broadcast applications.



PIV Application

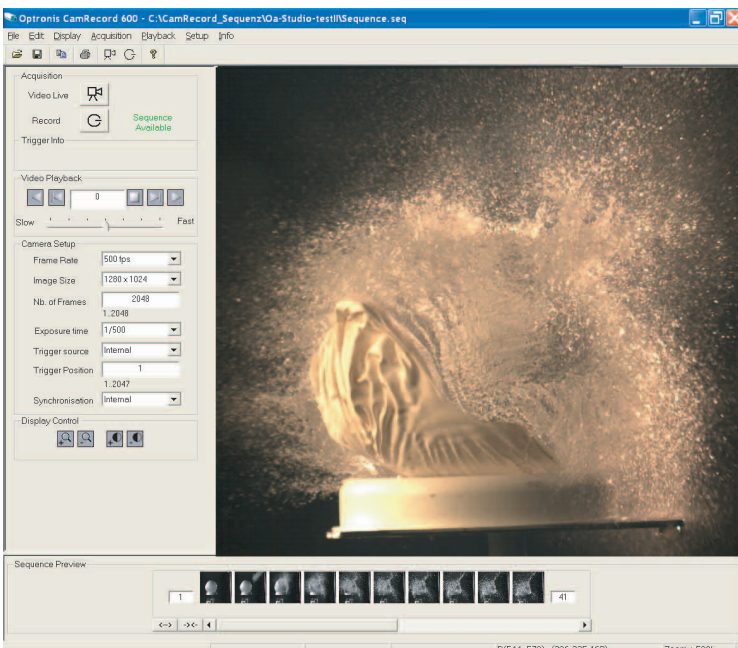


User Software

The camera is shipped as a turn-key system together with an easy-to-use control software under WindowsTM. The software allows to setup the camera, to display images in real-time for optical alignment, to acquire sequences and to store them onto the Laptop or Personal Computer.

Images that are captured by the CMOS sensor can be displayed before and during the acquisition of a sequence and allow for final optical adjustments even during the acquisition phase.

After triggering of the sequence, the camera data are stored into the camera memory and are available for analysis without time consuming download whereas the image analysis can be performed by slow motion or single image display. The acquired sequence can then be stored on the harddisk of the computer in Raw, Bitmap, Tiff as well as compressed AVI standard formats.



User Software

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Performance (Examples)

Speed	Resolution (H x V)	Video Memory: /4GB Recording Time at max. Speed	Video Memory: /8GB Recording Time at max. Speed
50 .. 500 fps	1 280 x 1 024	6.5 sec	13.0 sec
50 .. 850 fps	800 x 600	10.5 sec	21.0 sec
50 .. 875 fps	720 x 576	11.8 sec	23.6 sec
50 .. 1 000 fps	1 280 x 512	6.5 sec	13.0 sec
	640 x 480	13.9 sec	27.8 sec
50 .. 2 000 fps	1 280 x 256	6.5 sec	13.0 sec
	320 x 256	26.2 sec	52.4 sec
50 .. 4 000 fps	1 280 x 128	6.5 sec	13.0 sec
	160 x 128	52.4 sec	104.8 sec
50 .. 10 000 fps	1 280 x 50	6.7 sec	13.4 sec
	80 x 50	111.8 sec	223.6 sec
50 .. 25 000 fps	1 280 x 20	6.7 sec	13.4 sec
50 .. 50 000 fps	1 280 x 8	8.3 sec	16.6 sec
50 .. 100 000 fps	1 280 x 4	8.3 sec	16.6 sec

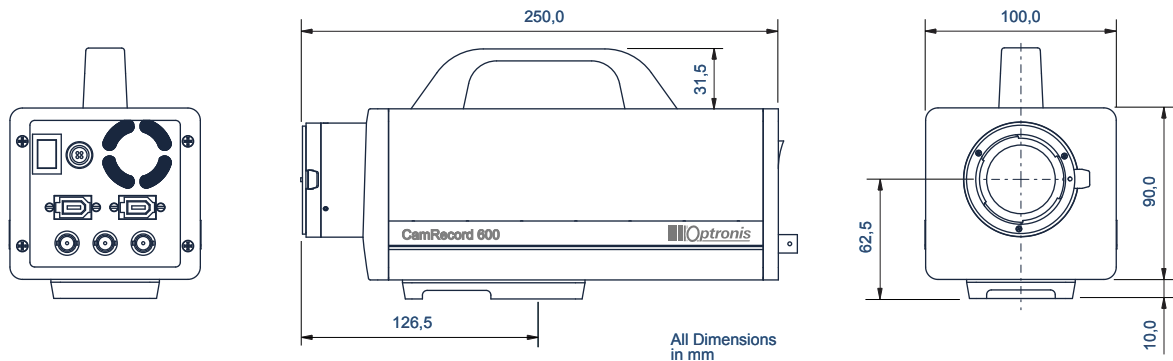
Software Options

/SDK	Software development kit
/LAB	Labview driver

Specifications

Image Sensor	CMOS monochrome or color (Bayer Pattern)
Resolution	1280 x 1024 Pixel @ full resolution
Active Area / Pixel Size	15.36mm x 12.29mm / 12 μ m x 12 μ m
A/D Conversion / Dynamic	10 bit or 8 bit selectable / 59dB (typ.)
Sensitivity	1600 bits / lux-second @ 550 nm (monochrome); ~ 50 ASA (color)
Shutter / Efficiency	global electronic shutter, min. 1 μ s exposure time / >99.9%
PIV Interframing Time	~ 200 nsec
Trigger Signal	TTL, switch, open collector, rising or falling edge, on image content variation
Synchronization	internal, external
Interface	IEEE1394a (FireWire [®])
Power	110 .. 240 V / 50..60 Hz (external AC/DC converter)
Lens Mount	F-mount (Nikon), C-mount optional
Weight	1,7 kg (typ. without lens)
Environmental Conditions	Operating temperature 0 .. 40°C; humidity < 80% relative, non-condensed
Dimensions	250mm(L) x 100mm(W) x 131,5mm(H) (without lens)

Accessories	User Software, Manual, Suitcase, FireWire Cable, Power Supply
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