High-Speed Microscope Camera

Upgrade your microscope with HD high-speed imaging

Turn your existing microscope setup into a high-speed microscope. Simply attach the *Motion*Grabber HD camera to the camera port, connect by USB3 to your laptop or desktop PC and start recording videos up to several thousand frames/second. No external camera power supply, no PC plugin card needed.

USB3 technology brings high-speed imaging within reach of any budget. *Motion*Grabber HD is a low-cost and easy to use camera system, ideal for exploring the world of high-speed imaging for microfluidics research. The system can be upgraded with faster cameras as the need evolves.

*Motion*Grabber HD consists of a tiny colour or monochrome CMOS camera with USB3 connection, and advanced multi-language video streaming software, capable of recording high-speed video directly to hard disk. It means that you can record continously during long experiments and never miss a single event. The software can even do real-time image compression, allowing continuous high-speed video recording for hours.

Flexible trigger and marking options allows synchronisation of the video recording to external events such as flourescense detection or injection/extraction events.
Image-based triggering allows capture of elusive events that can only be detected by real-time image analysis..
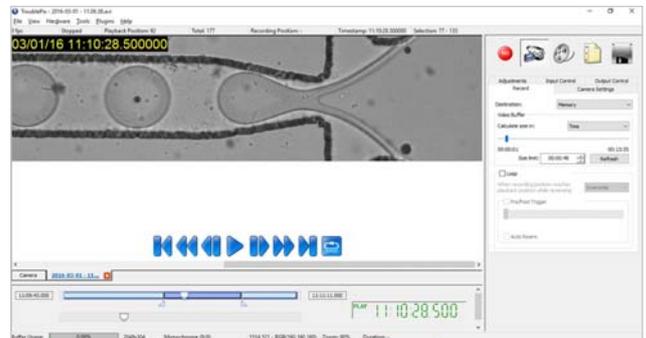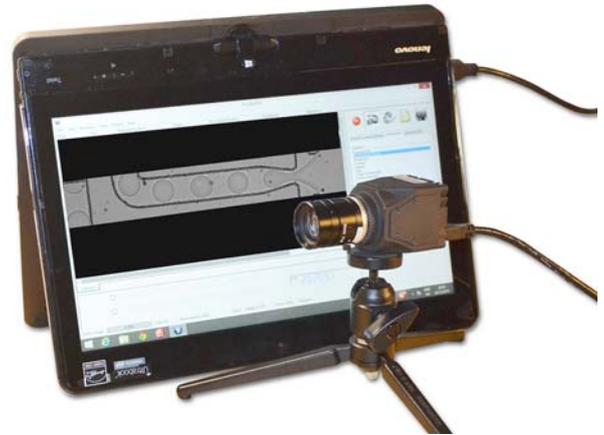
Benefits

- Fits any microscope with C-mount camera port – upright or inverted
- Captures high-speed videos up to 3000fps using standard microscope illuminator
- Connects to PC through USB3 port
- High-sensitivity 1.3, 2.3 or 5.3 Megapixel CMOS camera with superior dynamic range
- Exposure time down to $35\mu s$ for capture of fast-moving objects
- Long time recording at high speed, limited only by hard disk capacity
- Flexible trigger and marker options for synchronizing to external events
- Image based triggering for capturing only when image is changing
- Pre-post triggering: capture an event after it has happened
- Time stamp on every image for accurate reference to external events
- No cooling fan for vibration-free operation
- Colour or monochrome camera options
- Windows 7,8 and 10 compatible, 32/64bit, Multilanguage

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Camera Options

MotionGrabber HD is supplied with a choice of three cameras:

MG5000-075, using a 75fps, 5.3 Megapixel 1" CMOS sensor
MG2000-170, using a 170fps, 2.3 Megapixel 2/3" CMOS sensor
MG1300-220, using a 220fps 1.3 Megapixel 1/2" CMOS sensor

All cameras are capable of recording up to 3000fps with reduced image resolution and available in colour or monochrome. Monochrome cameras are more light-sensitive with sharper images, while colour cameras add colour information and give visually more attractive images.

The imaging speed of these cameras is limited primarily by the USB3 bus. The system can be supplied with substantially faster cameras using a high-speed video interface through a PC plug-in card.

Microscope illumination

High-speed video recording with short exposure time generally needs more light than conventional still image recording, requiring extra attention to the illumination.

Droplet dynamics can be recorded with either incident or transmitted light, but by far the most forgiving configuration in terms of light efficiency is transmitted light.

Standard transmitted light illumination is sufficient for most applications. For applications requiring very short exposure time or applications where the illumination must pass through a semi-transparent layer with low light transmission like PDMS, we can supply low cost, high-power LED illuminators suitable for exposure time down to 1 μs.

Specifications

Camera sensor	MG5000-75 : 2592x2048, 1" MG2000-170: 1920x1200, 2/3" MG1300-220: 1280x1024, 1/2" Colour or monochrome
Frame rate	MG5000-075: 75fps @ 2592x2048 814 @ 640x480 MG2000-170: 170ps @ 1920x1200 1000ps @ 640x480 MG1300-220: 220fps @ 1280x1024 840fps @ 640x480 2900fps @ 256x256
Exposure time	Down to 35μs
Camera control	Frame rate, image size, video gain, exposure time, dynamic range (8 - 12bits)
Camera dimension	29x29x39mm
Cable	USB3.0 up to 5m
Recording time at full resolution and speed	uncompressed 15 minutes (320GB disk) Compressed up to 10 hours (1.5TB disk)
Trigger	GUI, External switch, TTL input, motion detection
Automation	Auto-save, auto-name, auto-export video files
Video format	AVI, MP4, H.264, HEVC, BMP, TIFF, Jpeg, etc.
Time stamp	PC system time stamped on each image
Software compatibility	Windows 7, 8 or 10, 32 or 64 bit (64 bit recommended)
Language	English, French, German, Spanish, Chinese, Korean

High-Speed Microfluidics Microscopes

For best performance, you would need a microscope designed with special attention to illumination and imaging efficiency, and with optics compatible with large-sensor high-speed cameras.

Mengel Engineering supplies modular zoom high-speed microscopes, suitable for the *Motion*grabber high-speed cameras as well as for advanced high-speed cameras capable of recording at frame rates of 50.000 fps and beyond.

The microscopes are available in either upright or inverted configurations, allowing high-resolution recording of flow dynamics in chips accessible from either above or below, including transparent glass or hard polymer devices as well as PDMS devices.

The microscope body has multiple threads for mounting additional equipment, such as pumps, valves, reservoirs or fluidic breadboards.

Inverted microscope with a high-speed camera working at 500fps at 1280x1024 pixels. Transmitted light shown.

Upright microscope with a high-speed camera working at 6500fps at 1024x1024 pixels. Incident light shown.

Benefits

- High-quality optics with 6.5X zoom and high light efficiency
- 5X or 10X objectives with 34mm working distance
- Coarse/fine focusing
- Optional incident or transmitted light LED illuminators
- No heating of object by LED
- Illumination available in blue, green, red, white or NIR
- Optional EPI fluorescence illumination
- No cooling fan on LED for vibration-free operation
- Manual stage with 100x75mm travel and exchangeable inserts
- Compatible with cameras from 500 to 50.000 fps