

## MotionPro X5 and X5PLUS



Redlake's MotionPro® X5 high-speed motion camera combines HD+ resolution, high frame rate and advanced features you require for accurate high-speed motion analysis on your PC or Mac laptop or desktop computer. The enhanced sensitivity of the MotionPro® X5 combined with 250 fps at 4-megapixel resolution is perfect for research and development laboratory environments. The NEW PLUS option (available on monochrome cameras only) uses SmartCapture technology to effectively double the frame rate to 500 fps at full resolution while preserving the total length of record time.

The X5 and X5PLUS cameras feature the latest Gigabit ethernet along with USB2.0 for easy interface. They also feature NTSC/PAL video for continuous monitoring.

With the MotionPro®, camera integration could not be simpler. Just install the software, connect one or more X series cameras to USB 2.0 or ethernet ports (or both), and you are ready to capture high-speed digital imagery. Control the camera with the feature-rich MotionPro® X software or use the LabVIEW™ or MATLAB® plug-in to integrate it into a larger experiment setup. To create your own control software, an SDK is included.

The extensive image processing algorithms include binning (2x2, 3x3, and 4x4), filtering, advanced color control, and programmable LUT enable you to maximize the image quality under various lighting conditions.

Flexible recording options allow the user to capture pre-selected number of frames before and/or after receiving a trigger. Double-exposure mode, with a 100 nanoseconds inter-frame time, is perfect for motion analysis on objects moving at very high speeds. Memory may be divided into multiple sessions with or without automatic download to assure no event is missed.

**Applications:** Microscopy, Ballistics and Munitions testing, Biomechanical research, Fluid dynamics research (PIV), Off-board vehicle impact testing

Features	Benefits
<b>Up to 2352 x 1728 resolution color or mono</b>	Better than HD resolution for capturing the finest detail even at high frame rates
<b>Fast frame rates from 250 fps at full resolution 50,000 fps reduced resolution</b>	Perfect for capturing movies of fast dynamics of a process or event
<b>NEW PLUS option to effectively double the frame rate and memory size (Mono only)</b>	Allows twice the time resolution while preserving the total length of record time
<b>Gigabit Ethernet and USB2.0</b>	Operate camera from remote locations via Gigabit Ethernet while using USB 2.0 for local monitoring
<b>100 nanosecond inter-frame time in double exposure mode</b>	perform particle imaging velocimetry (PIV) measurements to study fast moving fluids
<b>iPod and PDA compatibility</b>	Store movies on to iPod (video) for quick review. Control the camera operation remotely and wirelessly via PDA interface

### Sample Frame Rates (@ Max. Horizontal resolution of 2352)

Vertical Resolution	X5 (fps)	X5PLUS frame rate* (fps)
1728	250	500
864	500	1000
432	1000	2000
216	2000	4000
108	4000	8000
54	8000	16,000

Note: Horizontal resolution does not affect frame rate performance. \*PLUS option is available for monochrome versions only. Effective frame rate is shown for X5PLUS.

### Accessories

<b>X Timing Hub</b>	8 independently adjustable CMOS level outputs, 2 inputs; USB interface
<b>X Data Acquisition System</b>	16 analog inputs and 4 analog outputs, USB interface
<b>USB Repeater</b>	For use up to 15m

## MotionPro X5 and X5PLUS Performance Specifications

<b>CMOS Imager</b>	
<b>Sensor Array</b>	Area Array with 7 $\mu$ m x 7 $\mu$ m pixels, color or monochrome
<b>Image Resolution</b>	Up to 2352 x 1728
<b>Dynamic Range</b>	59 dB at sensor
<b>Memory and Record Rates</b>	
<b>On-board Storage</b>	4 GB; with <i>PLUS</i> option, the memory is effectively doubled
<b>Recording Rates</b>	X5: Selectable, 250 fps @ full resolution X5PLUS (optional): 500 fps @ full resolution; available in monochrome version only
<b>Playback Rates</b>	User selectable
<b>Camera Control</b>	
<b>Shutter</b>	Global Electronic Shutter variable from 1 $\mu$ s, optional 100 nanosecond exposure*
<b>Exposure modes</b>	Single, Double, XDR (eXtended Dynamic Range)
<b>Trigger Frame</b>	Variable position from start to the maximum available frame capacity
<b>Trigger Mode</b>	CMOS level (3.3v) via BNC connectors
<b>Time Stamp</b>	Each frame
<b>Software</b>	
<b>Control Software</b>	MotionPro X; Windows 2000/XP, Mac OS X** (10.3 or later)
<b>Image Processing Algorithms</b>	Binning, filtering, advance color control, and programmable LUT
<b>Plug-ins</b>	LabVIEW™ for PC; MATLAB® for PC and Mac; Twain Driver for PC and Mac
<b>File Formats</b>	TIFF, BMP, PNG, MRF, MCF, AVI, BLD, MPEG, and MOV (Mac only)
<b>Mechanical Description</b>	
<b>Camera Dimensions</b>	3.7 in (95 mm) H x 3.7 in (95 mm) W x 6.4 in (162 mm) L
<b>Camera Weight</b>	4.2 lbs (1.9 kg)
<b>Camera to PC Interface</b>	USB 2.0; Dual USB 2.0&Gigabit Ethernet (optional)
<b>Camera Cable Lengths</b>	5m (USB2.0); Longer cable lengths (not supplied) may be used with GigE
<b>Lens Compatibility</b>	1" C-mount
<b>Lens Mount</b>	C-mount, F-mount adapter (optional)
<b>Synchronization</b>	
<b>Synchronization (USB Hub Optional)</b>	All cameras are synchronized with each other using an external sync pulse on 3.3v CMOS BNC connector
<b>Environmental</b>	
<b>Camera Power</b>	+24 vdc (100-240 VAC, 50-60 Hz ac/dc convertor)
<b>Operating Temperature</b>	+5°C to +40°C Ambient (0°F to 122°F)
<b>Emission/Safety</b>	CE approved, FCC Class B compliant, UL listed
<b>Input/Output</b>	
Trig In (BNC) Sync In (BNC) Sync Out (BNC) USB 2.0 (LEMO) Gigabit Ethernet Live Out (BNC) RS170 (NTSC/PAL) DC Power (LEMO)	

\*Enquire with factory  
 \*\*GigE interface is not supported under Mac.  
 Specifications are subject to change.

**REDLAKE**



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