

**Digital Monochrome (b/w)
Progressive Scan Camera**

 System: **IEEE1394a**
Baumer FWX20

 Art. No: **OD106709**

- IEEE1394a (FireWire™) progressive scan CCD camera
- 1624 x 1236 pixel
- Outstanding image quality
- High-speed up to 12 full frames per second
- High sensitivity and dynamic range
- High quality slow scan mode for lowest readout noise
- Binning and true partial scan function (ROI) for increased frame rates
- External synchronization via asynchronous trigger and flash sync function
- Integrated 8 MByte RAM for temporarily image data buffering
- Compact robust aluminum housing
- Industrial IEEE1394a connector
- Camera parameter in real-time programmable
- Powerful Baumer FCAM1394 driver (OHCI standard compliant) / Software Development Kit for Windows / Linux
- IEEE1394a interface
- User-friendly Baumer TWAIN compatible image capture and camera control software



shown lens needs to be ordered separately

1. Overview

Sensor	1/1.8" interline progressive scan CCD				
Shutter / readout mode	global shutter / progressive scan readout				
Number of pixel	1624 x 1236				
Scan area	7.15 mm x 5.44 mm				
Pixel size	4.4 µm x 4.4 µm				
Color filter	-				
Operation modes					
Trigger mode	yes				
Free running mode	yes, sequential shutter operation				
Signal processing	real-time software programmable				
Pixel clock	29.5 MHz fast scan / 14.75 MHz high quality (HQ) scan				
A/D converter	12 bit				
Exposure control (t _{exp})	total: 4 µsec .. 2 sec 4 µsec .. 65 msec: step 1 µsec 70 msec .. 2 sec: step 10 msec				
Gain control	0 .. 20 dB , 1024 steps				
Offset (black level)	0 .. 255 LSB (12 bit)				
Image data buffer	8 MByte				
Image acquisition					
Data format	raw image data from camera				
Camera image format modes (see item 3)	Format (pixel)	Bit per pixel	Pixel clock MHz	Frames per sec. *)	t_{readout}
Full frame	slow	1624 x 1236	14.75	6	164 msec
	fast	1236	29.5	12	82 msec
Binning 2x2	slow	812 x 618	14.75	12	82 msec
	fast		29.5	24	41 msec
Partial scan function	yes, format freely programmable in all modes (binning on partial scan ok)				

Technical specifications subject to change

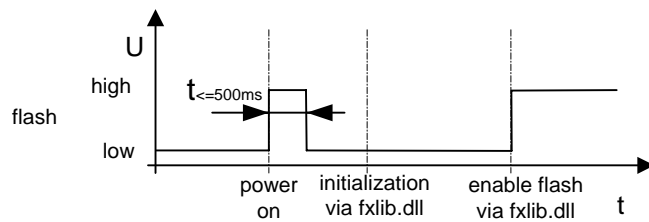
Brightness correction function	optional in binning mode		
Test pattern function	yes, in all modes		
Data quality	at 20 °C, gain = 1, exposure time = 32 msec, full frame mode, slow scan		
Readout noise	$\sigma < 0.5$ LSB (8 bit) typical		
Dynamic range	typical > 54 dB		
Optical interface	C-Mount		
Optical filter	dust protection option: super polished, IR cut filter or no filter		
Process interface functions			
Async. trigger	yes, trigger mode operation, software trigger and external trigger signal		
External flash sync	yes		
Software reset	yes, in free running mode, delay up to 164 msec		
Asynchronous reset	Full frame	slow	delay up to 22 msec
		fast	11 msec
	Binning 2x2	slow	delay up to 11 msec
		fast	6 msec
Image data header	yes		
Electrical interface			
Data / control / power	standard single cable IEEE1394a / 6 pins option: screw lock type connector		
Digital input	1: trigger signal, opto decoupled, 3 V .. 14 V / 20 mA trailing edge **) min. trigger impulse length (t_{min}): 1 μ sec max. trigger delay (t_{delay}): 4 μ sec		
Digital output	1: flash sync signal, 12 V / 20 mA low active **)		
LED	green: power on / yellow: data transmission active		
Power consumption	approx. 3 Watt		
Environmental			
Storage temperature	-10 °C .. +70 °C		
Operating temperature	+5 °C .. +50 °C		
Humidity	10 % .. 90 % non condensing		
Housing	aluminum		
Dimensions	73 x 56 x 55 mm ³		
Weight	340 g		
IEEE1394a interface	OHCI standard compliant		
Software	Baumer FCAM1394 driver / SDK for Windows 2000 / Windows XP / Linux Kernel 2.4.>22, 2.6.xx Baumer TWAIN image capture and camera control software		

*) maximum frame rate in free running mode, effective frame rate depending on SDK image mode settings and set exposure time
 **) can be inverted via software

2. Camera Factory Settings after Camera Start-Up

	Camera factory settings after camera start-up
Operation modes	free running mode
Signal processing	
Exposure control	32 msec
Gain control	factor 1 = 0 dB
Offset (black level)	0
Image acquisition	
Camera image format mode	mode ID = 0: full frame HQ (see item 3)
Partial scan function	not active
Electrical interface	
Flash sync signal	disabled, digital output set to low status *)

*) Electrical interface: flash sync signal



3. SDK Supported Image Formats

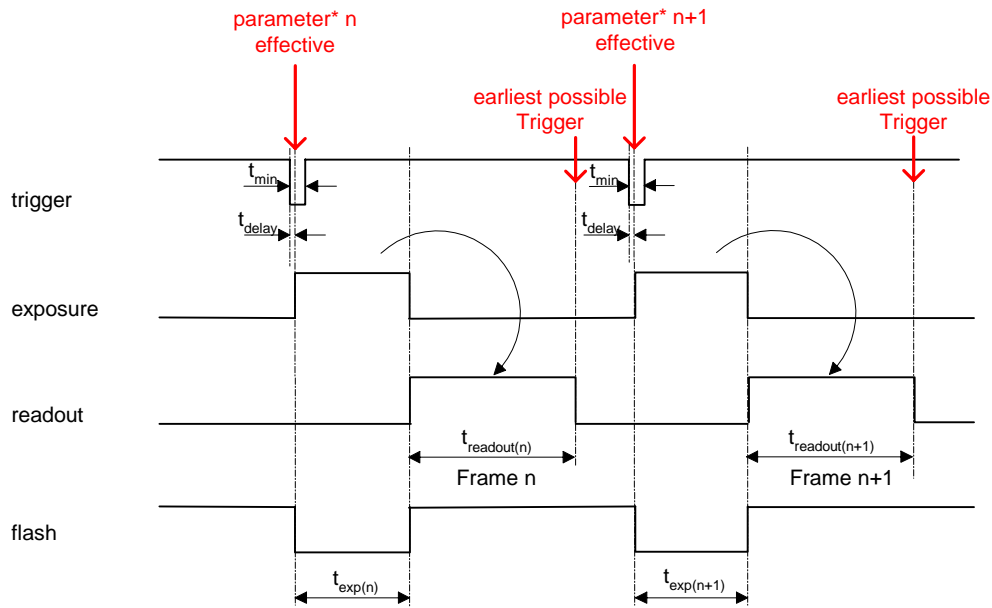
Software name	FWX20				
Camera mode	SDK image mode				
	Mode ID	Description	Image format	Color coding	Functions / State
Full Frame slow	0	Full Frame HQ	1624 x 1236	RawMono8, Mono8	PS, T, F, Mono
Full Frame fast	1	Full Frame	1624 x 1236	RawMono8, Mono8	PS, T, F, Mono
Binning 2x2 slow	2	Binning 2x2 HQ	812 x 618	RawMono8, Mono8	PS, T, F, BRC, Mono
Binning 2x2 fast	3	Binning 2x2	812 x 618	RawMono8, Mono8	PS, T, F, BRC, Mono

- SDK - Software Development Kit
- HQ - high quality
- BRC - brightness correction
- PS - partial scan
- T - trigger
- F - flash
- Mono - monochrome mode

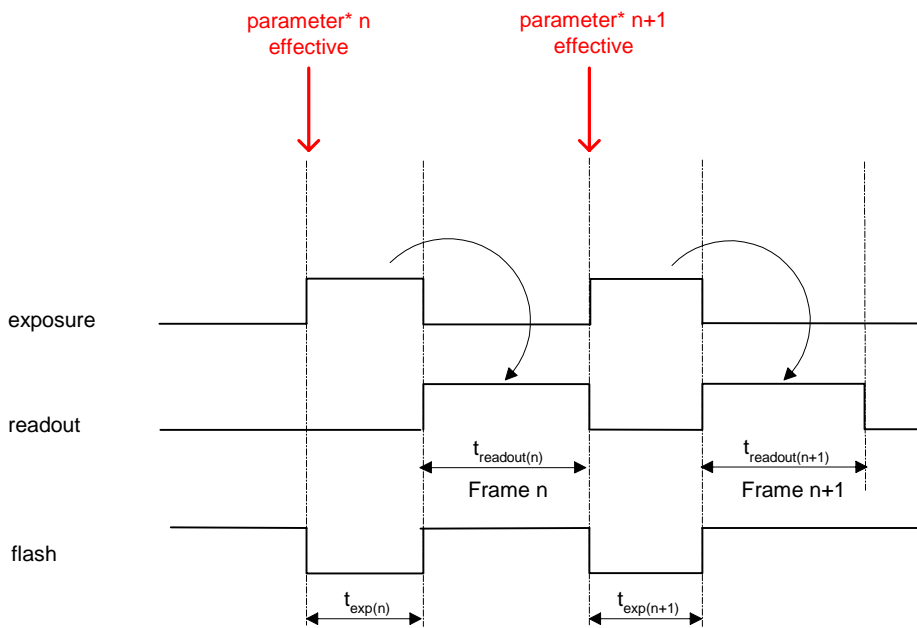
- RawMono8 - unmanipulated pixel data for monochrome camera modes in 8 bit
- Mono8 - software corrected image data for monochrome camera modes in 8 bit

4. Timing Operation Modes

Trigger Mode: sequential operation

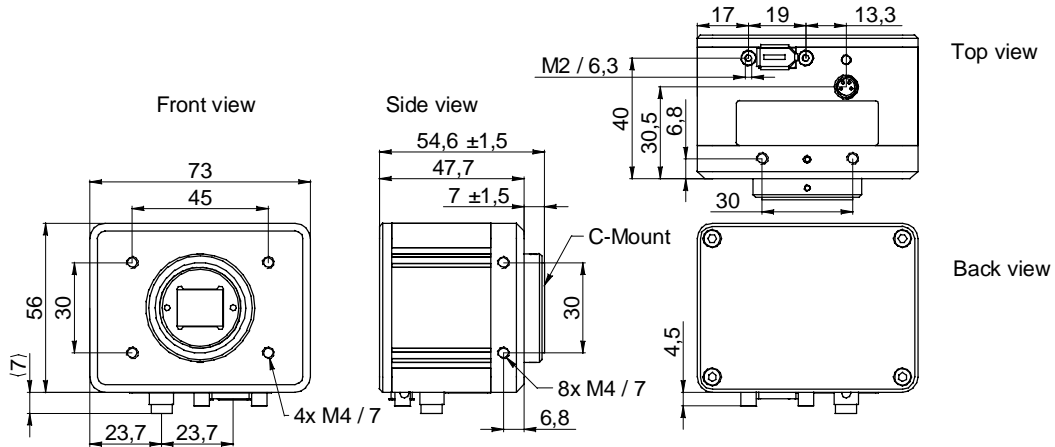


Free Running Mode: sequential operation

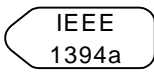



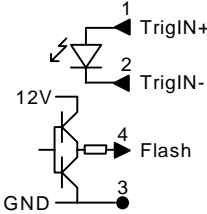
* image parameter: exposure time
offset
global gain
mode
partial scan

5. Housing



6. Connectors / Electrical Interfaces

IEEE1394a	Pin
	1: Power 2: GND 3: TPB- 4: TPB+ 5: TPA- 6: TPA+

Trigger / Flash	Type: Lumberg RSMESD 4pin.
	
	Trigger / Flash cable wires color *): 1 = brown 2 = white 3 = blue 4 = black

*) shielded trigger / flash cable needs to be used and ordered separately

End of Document