

Digital high speed camera

HAS-EF

**5.2 Mega pixel 2560 × 2048 resolution
at 250 frames / second
6GB Embedded memory**



HAS-EF is a high speed camera with 1-inch CMOS sensor and 2560 × 2048 effective pixels that can shoot 250 fps at full resolution, 500 fps at full HD, 1,400 fps at VGA, and up to 14,000 fps by limiting the pixel area. Perfect for multiple high speed camera imaging, with 6GB embedded memory, in one compact solution.

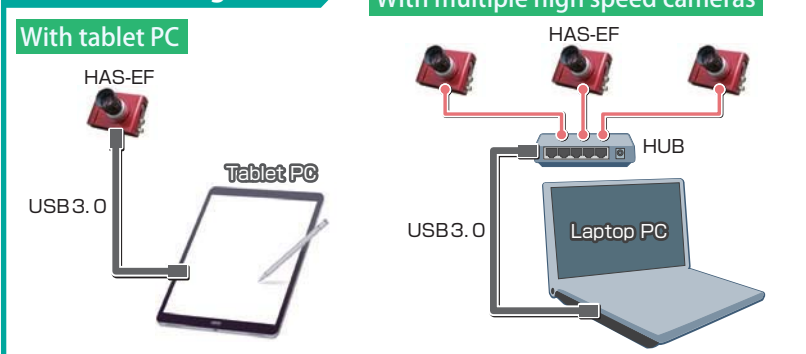
- Battery operation is possible.
- 6GB embedded memory allows you to record 3,000 frames at full HD and 20,000 frames at VGA.
- Good balance between high resolution and high frame rates.
- Fully synchronized multiple high speed cameras with just one laptop PC.
- Internal / External sync
- 12bit A / D

Well suited for all kinds of research / production engineering in behavior, fluid, sports science, biomechanical, robotics, machine vision, crash test, droplet, microscopy, trouble shooting, and more.

Frame rate and pixel size

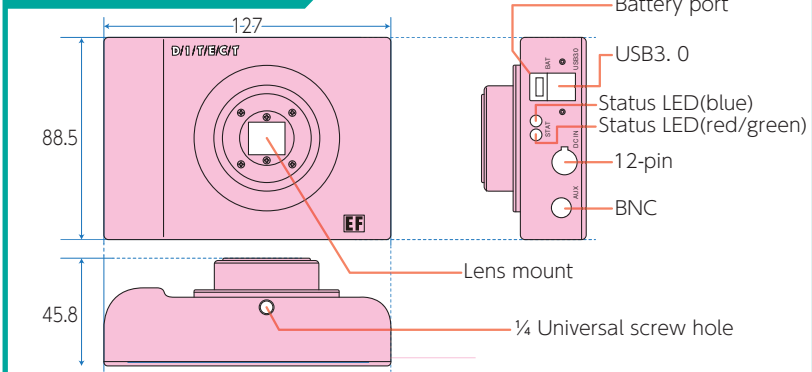
Pix Fps	H		256		320		512		640		800		1024		1280		1600		1920		2560			
	V	V	32	64	128	128	240	256	320	480	600	768	1024	1200	1080	600	240	480	600	1024	1200	2048		
14000			●																					
10000			○																					
8000			○	●																				
5000			○	○																				
4000			○	○	●	●																		
3000			○	○	○	○																		
2700			○	○	○	○	●																	
2500					○	○	○	●																
2000						○	○	○											●					
1500							○	○	○	●										○				
1400							○	○	○	○	●									○				
1000								○	○	○	○	○	●								○	○	○	
800									○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
500										○	○	○	○	○	○	○	○	○	○	○	○	○	○	
400											○	○	○	○	○	○	○	○	○	○	○	○	○	
300												○	○	○	○	○	○	○	○	○	○	○	○	
250													○	○	○	○	○	○	○	○	○	○	○	
200														○	○	○	○	○	○	○	○	○	○	
100															○	○	○	○	○	○	○	○	○	
60																○	○	○	○	○	○	○	○	
30																	○	○	○	○	○	○	○	
Recording frames			782077	391039	195377	156325	83341	48836	39071	20836	13336	8140	4885	3335	3088	5210	10419	5210	4168	2443	2085	1222		
Recording time(sec)			55.8	48.8	48.8	39	30.8	19.5	26.0	14.8	13.3	10.1	9.7	6.6	6.1	5.2	5.2	5.2	5.2	4.8	5.2	4.8		

Connection diagram



*AC and sync cables are not listed in the diagram.
*Hub and the cable between hub and PC are optional.

HAS-EF Dimensions



Specifications

Camera	
Camera type	Mono (HAS-EFM) Color (HAS-EFC)
Sensor type	CMOS
A/D	12bit
Effective resolution	2560 × 2048 (5.2M pixel)
Sensor format	1-inch
Lens mount	C
Recording mode	Embedded memory
Memory size	6 GB
Data output interface	USB3.0 (Type B)
Shutter (exposure)	Minimum 1/1000,000 (100 μ s)
Sensitivity	6 V / lux .s
Power input	12 pin AC (battery as option) / 12V
Electric requirement	12W
Control software	
Trigger mode	Start/End/Variable (3.3V TTL or contact signal) and motion trigger
Aux function	Histogram, Guide line, Focus peaking, Live image rotation, Time stamp, Trimming, Text
Image format	AVI, WMV, BMP / JPEG, PNG
Supported OS	Windows 7, 8, 10
Included items	USB3.0 cable, AC adapter, control software

*Specifications and external appearance may be subject to change without notice.



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