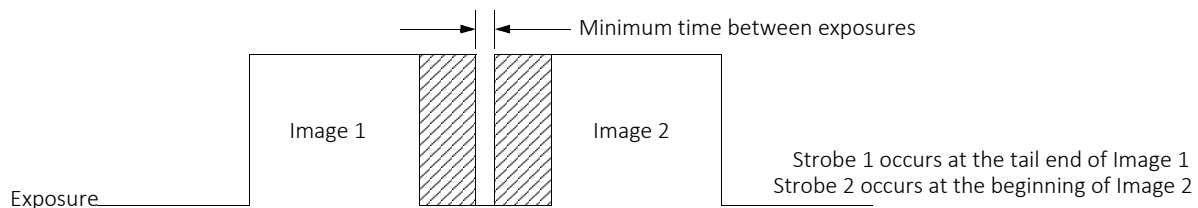


Introduction

Given the ability of CCD and some CMOS sensors to simultaneously readout an image while exposing the next image, this allows for a relatively short time between two images, given the camera's exposure time setting is equal to or greater than the sensor readout time.

The minimum time between exposures value can be useful for particle image velocimetry (PIV) applications, where two images are taken in rapid succession to measure the speed of a moving object.

Because the exposure time setting must be greater than or equal to the sensor readout time, which is approximated as $1/(\text{camera max frame rate})$ and in the millisecond range, PIV users will need to use precisely timed strobe(s) in an otherwise dark operating environment in order to achieve suitable results:



To set strobe(s), there are two possible options, as determined by the camera type. Both options use the camera `SyncOut1/2/3` signal to trigger a strobe.

Option 1

For cameras in table without an asterisk (*), a single strobe pulse may be used which spans both exposures.

`SyncOut1/2/3 = Strobe1`

`Strobe1Mode = Exposing`

`Strobe1Duration = Required Strobe Length * 2 + Min Time Between Exposures`

`Strobe1Delay = ExposureValue - Required Strobe Length`

With `Strobe1Mode = Exposing`, the strobe pulse is tied to the rising edge of the camera's internal exposure signal. However, every second `SyncOut1/2/3` strobe trigger from the camera must be ignored by the strobe. Otherwise, two strobes are generated for each pair, with the second triggering off the rising edge of the second image and firing at the tail end of the second image.

Option 2

For cameras in table with an asterisk (*), two strobes are necessary. This is due to an existing limitation of the camera firmware, in which the minimum time between exposures varies between two discrete values, from image pair to image pair. For example, the GB2450 has a minimum time of 15.2 μ s between the first image pair, and 20.8 μ s between the next image pair. All quoted values use the longer of the two measured values. The reason for this variation is unknown, but we are working towards resolving this.

Given the variation, a single strobe pulse cannot be used, as the second image will be brighter and contain motion blur in the case when the minimum exposure time between images is shorter than quoted. Two strobes are necessary.

Strobe1:

$SyncOut1/2/3 = Strobe1$

$Strobe1Mode = Exposing$

$Strobe1Duration = Required\ Strobe\ Length$

$Strobe1Delay = ExposureValue - Required\ Strobe\ Length$

Strobe2:

Tied to Strobe 1 and triggered with external logic Minimum Time Between Exposures + Required Strobe Length after Strobe1.

As with Option 1, every second $SyncOut1/2/3$ strobe trigger from the camera must be ignored by the strobe.

Minimum time between exposures



GB650*	78.0 μ s	GC650*	121 μ s	GE680*	38.2 μ s	GT1290*	90 μ s	GX1050	19.9 μ s	G-031	15 μ s	G-030	96 μ s
GB660*	75.0 μ s	GC655*	121 μ s	GE1050*	134 μ s	GT1380*	80 μ s	GX1660	19.6 μ s	G-032	283 μ s	G-032	74 μ s
GB1380*	80.0 μ s	GC660*	75.0 μ s	GE1650*	104 μ s	GT1600	64 μ s	GX1910	19.9 μ s	G-033	93 μ s	G-125	70 μ s
GB2450*	20.8 μ s	GC750	91.0 μ s	GE1660*	62.1 μ s	GT1660	23.6 μ s	GX1920	50.0 μ s	G-046	114 μ s	G-131	24 μ s
		GC780*	113 μ s	GE1900*	113 μ s	GT1910	26 μ s	GX2300	21.4 μ s	G-125	63 μ s	G-192	34 μ s
		GC1020*	123 μ s	GE1910*	71.0 μ s	GT1920	52 μ s	GX2750	N/A	G-145	106 μ s	G-223	84 μ s
		GC1290*	89.8 μ s	GE2040*	115 μ s	GT1930	196 μ s	GX3300	22.2 μ s	G-145-30fps	35 μ s	G-234	269 μ s
		GC1350*	107 μ s	GE4000*	110 μ s	GT1930L	196 μ s	GX6600	44.0 μ s	G-146	88 μ s	G-419	130 μ s
		GC1380*	125 μ s	GE4900*	110 μ s	GT2000	76 μ s			G-201	60 μ s	G-503	451 μ s
		GC1380H*	84.0 μ s			GT2050	116 μ s			G-201-30fps	72 μ s		
		GC1600*	115 μ s			GT2300	25 μ s			G-223	69 μ s		
		GC1600H*	60.0 μ s			GT2450*	24.8 μ s			G-235	210 μ s		
		GC2450*	20.8 μ s			GT2750	55 μ s			G-282	47 μ s		
						GT3300	29 μ s			G-283	47 μ s		
						GT3400	54 μ s			G-419	107 μ s		
						GT4907	56 μ s			G-504	29 μ s		
						GT6600	48 μ s			G-505***	76 μ s		

					G-609	47 μ s	
					G-917	47 μ s	

*Requires two strobes, as mentioned above.

**No simultaneous readout and exposure mode for this sensor.

***Gives two values; 43 μ s and 76 μ s; picking the larger of the two = 76 μ s.



For GS series: same timing as corresponding GB camera.

For color sensors, and varying sensor classes within a model: use the timing values as listed above.

The measured values for minimum time between the exposures are unlikely to change with future firmware updates.

Additional References

Technical manuals and GigE feature reference

<https://www.alliedvision.com/en/support/technical-documentation>

For technical support, please contact support@alliedvision.com.

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