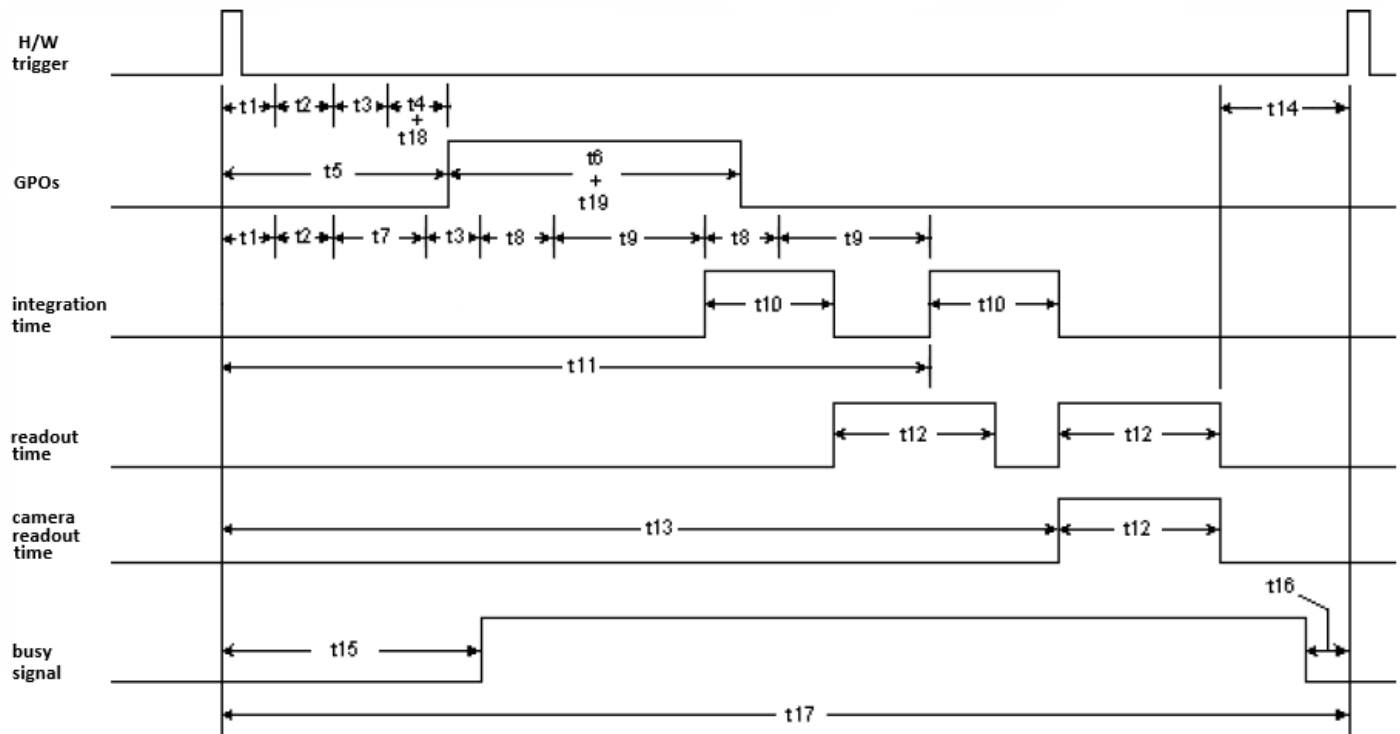# PL-D7620 Timing Diagram

Note: The PL-D7620 camera model can currently output half of its maximum frame rate when it is software of hardware triggered since only every second frame gets delivered to the host.

Picture 1. Timing diagram for trigger pulses.

Table 1.1 Signal Information

Signal	Description	Min	Typ	Max
t1	Board Level hardware propagation delay (3.3V HCMOS to trigger)		10 ns	
	Enclosed hardware propagation delay (5V to trigger optocoupler)		8 us ON 30 us OFF (Note 1)	
	Enclosed hardware propagation delay (12V to trigger optocoupler)		2.5 us ON 40 us OFF (Note 1)	
t2	Debounce time		1.0 us	
t3	1H period	0.0 us	varies between Min and Max	See Table 1.2
t4	Programmable GPO delay	0.0 us	in 10 us steps	2.5 sec
t5	Start of trigger to start of GPO (t1 + t2 + t3 + t4 + t18)			
t6	Programmable GPO time	10.0 us	in 10 us steps	2.5 sec
t7	Trigger mode 14 Programmable integration delay (Note 2)	0.0 us	in 10 us steps	2.5 sec
t8	Communication		See Table 1.2	
t9	Integration shutdown period	11.0 us	1/(frame rate) - t10	
t10	Integration time		See Integration Times	
t11	Start of trigger to start of second frame integration (Note 3, 4)		$t1 + t2 + t7 + t3 + 2 \cdot t8 + 2 \cdot t9$	
t12	Read out time (Note 5)		See Readout Times	
t13	Start of trigger to start of second frame read out		t10 + t11	
t14	End of read out to start of trigger		t17 - t12 - t13	
t15	Start of trigger to start of busy		t1 + t2 + t3	
t16	End of busy to start of trigger	30.0 ns	$t17 - t12 - t13 - t3_{Max}$	
t17	Frame period		t12 + t13 + t14	
t18 & t19	Board Level hardware propagation delay (3.3V HCMOS From GPO)		20 ns	
	Enclosed hardware propagation delay (GPO optocoupler with 1K pullup to 5V)		3 us ON 70 us OFF (Note 1)	

Note:
1. "ON" refers to current flowing through the optocoupler and "OFF" refers to no current flowing through the optocoupler. Refer to interface schematics.
2. For minimum hardware trigger, the programmable integration delay (t7) should be set to 0 (minimum).
3. For a software trigger, t11 = 1.7 ms + (2·t8 + 2·t9) typical.
4. The second frame integration is provided since only every second frame gets delivered to the host (see Note 5 below).
5. Camera readout time indicates the start of the second frame readout since only every second frame gets delivered to the host after software or hardware trigger is detected.

Table 1.2 Maximum of 1H and Communication period for PL-D7620 camera

PL-D7620	For 8-bit output in (us)	For 12-bit output in (us)
1H Max	12.417	14.890
Communication	86.920	116.670