

Application Note:

Interfacing non-standard cameras to Matrox Pulsar



DALSA CA-D1-0256S

October 25, 1996

Camera Interface Overview	• 256 x 256 x 8-bit @ up to 225fps • Analog video output • External syncs and pixel clocks • External exposure control																																																												
Camera Interface Details	Continuous mode <pre>graph LR; Dalsa[Dalsa CA-D1] -- Video --> Matrox[Matrox Pulsar (with PLS/TTL/CABLE)]; Matrox -- MCLK --> Dalsa; Dalsa -- PVAL --> Matrox; Matrox -- EXSYNC --> Dalsa; Dalsa -- LVAL --> Matrox; Matrox -- FVAL --> Dalsa;</pre> • 256 x 256 x 8-bit @ up to 225fps • Analog video output • External sync • Matrox Pulsar sending reference clock (MCLK @ 32MHz) and periodic EXPOSURE1 (EXSYNC) signals (both RS-422) to camera. The frequency of the EXPOSURE1 signal determines both the exposure time and the frame rate; the EXPOSURE1 pulse initiates frame readout • Matrox Pulsar receiving RS-422 pixel clock (PVAL @ 16MHz), RS-422 hsync (LVAL) and RS-422 vsync (FVAL) signals from camera • DCF used: CAD1.DCF																																																												
Cabling Requirements	Continuous mode • IMG-7W2-TO-1BNC cable required for video output and PLS/TTL/CABLE required for digital syncs (RS-422) • Video input BNC of IMG-7W2-TO-1BNC cable should be connected to VIDEO OUT BNC connector of camera • The connections between the DB-25 male connector of the camera and the DB-37 connector of the PLS/TTL/CABLE are as follows: <table><thead><tr><th colspan="3">DALSA CA-D1-0256S (DB-25 male connector)</th><th></th><th colspan="2">PLS/TTL/CABLE (DB-37 connector)</th></tr><tr><th>Pin name</th><th>Pin no.</th><th></th><th></th><th>Pin name</th><th>Pin no.</th></tr></thead><tbody><tr><td>EXSYNC+</td><td>17</td><td>←</td><td></td><td>EXPOSURE1+</td><td>21</td></tr><tr><td>EXSYNC-</td><td>4</td><td>←</td><td></td><td>EXPOSURE1-</td><td>2</td></tr><tr><td>MCLK+</td><td>6</td><td>←</td><td></td><td>CLKOUT+</td><td>24</td></tr><tr><td>MCLK-</td><td>19</td><td>←</td><td></td><td>CLKOUT-</td><td>5</td></tr><tr><td>PVAL+</td><td>16</td><td>→</td><td></td><td>CLKIN+</td><td>4</td></tr><tr><td>PVAL -</td><td>3</td><td>→</td><td></td><td>CLKIN-</td><td>22</td></tr><tr><td>LVAL+</td><td>2</td><td>→</td><td></td><td>HSYNC+</td><td>16</td></tr><tr><td>LVAL-</td><td>15</td><td>→</td><td></td><td>HSYNC-</td><td>34</td></tr></tbody></table> (Pin-out continued)	DALSA CA-D1-0256S (DB-25 male connector)				PLS/TTL/CABLE (DB-37 connector)		Pin name	Pin no.			Pin name	Pin no.	EXSYNC+	17	←		EXPOSURE1+	21	EXSYNC-	4	←		EXPOSURE1-	2	MCLK+	6	←		CLKOUT+	24	MCLK-	19	←		CLKOUT-	5	PVAL+	16	→		CLKIN+	4	PVAL -	3	→		CLKIN-	22	LVAL+	2	→		HSYNC+	16	LVAL-	15	→		HSYNC-	34
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Cabling Requirements Requirements (continued)	DALSA CA-D1-0256S (DB-25 male connector)		PLS/TTL/CABLE (DB-37 connector)		
	Pin name	Pin no.	Pin name	Pin no.	
	FVAL+	23	→	VSYNC+	29
	FVAL−	10	→	VSYNC−	10
	*GROUND	7		GROUND	3
	*GROUND	11		GROUND	6
	*GROUND	20		GROUND	7
	*GROUND	24		GROUND	23
	*POWER SUPPLY GROUND			GROUND	33
	NOTE: it is very important that all the GROUNDS of the camera be connected together to the POWER SUPPLY GROUND, which in turn must be connected to the GROUND of the Matrox Pulsar The connections between the DB-25 connector on the rear panel of the camera and the power supply are as follows:				
DALSA CA-D1-0256S (DB-25 male connector)		POWER SUPPLY			
Pin no.	Pin name				
8	+5V	→ +5V			
9	+15V	→ +15V			
12	−5V	→ −5V			
13	+5V	→ +5V			
21	+15V	→ +15V			
22	−5V	→ −5V			
25	−15V	→ −15V			
Special Considerations	The Matrox Pulsar sends the RS-422 reference clock (MCLK @ 32MHz) to the camera, which divides this frequency by two and returns to the Matrox Pulsar the pixel clock signal (PVAL @ 16MHz). The camera initiates a frame upon arrival of the EXPOSURE1 (EXSYNC) pulse, which is sent to the camera periodically by the Matrox Pulsar. The cycle begins with the high speed transfer, from the sensing area to the storage area of the CCD, of the charges that made up the previous frame. Following this charge transfer period, both the readout of the previous frame and the integration period of the current frame begin simultaneously. The camera sends the RS-422 vsync (FVAL) and hsync (LVAL) signals to the Matrox Pulsar to indicate valid frames of data and valid lines of data, respectively; both signals are active high. Continued				

Application Note:

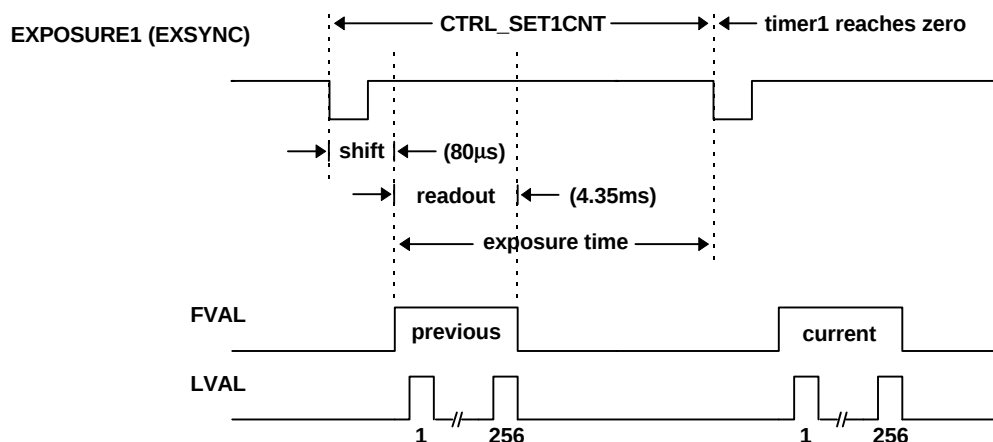
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Special Considerations (continued)



- In order to select the exposure time, and consequently the frame rate, the frequency of the EXSYNC signal supplied to the camera must be altered. The EXPOSURE1 (EXSYNC) pulse is sent to the camera periodically; to alter the frequency of this signal, the deployment time of the EXPOSURE1 pulse can be modified using Matrox Intellicam. Consult the Matrox Intellicam User Guide for more information.

IMPORTANT! These instructions must be followed very carefully. Please consult Matrox Imaging Applications at (514) 822-6061 if assistance is required.

The DCF(s) mentioned in this application note can be found on the MIL and MIL-Lite CD, or our FTP site ([ftp.matrox.com](ftp:ftp.matrox.com)). The information furnished by Matrox Electronics System, Ltd. is believed to be accurate and reliable. Please verify all interface connections with camera documentation or manual. Contact your local sales representative or Matrox Sales office or Matrox Imaging Applications at 514-822-6061 for assistance.

Corporate
Headquarters:
Canada and U.S.A.
Matrox Electronic
Systems Ltd.
1055 St.Regis Blvd.
Dorval, Quebec, Canada
H9P 2T4
Tel: (514) 685-7230
Fax: (514) 822-6273

