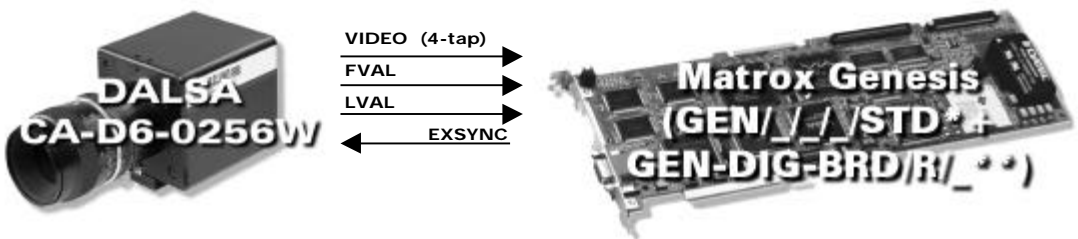
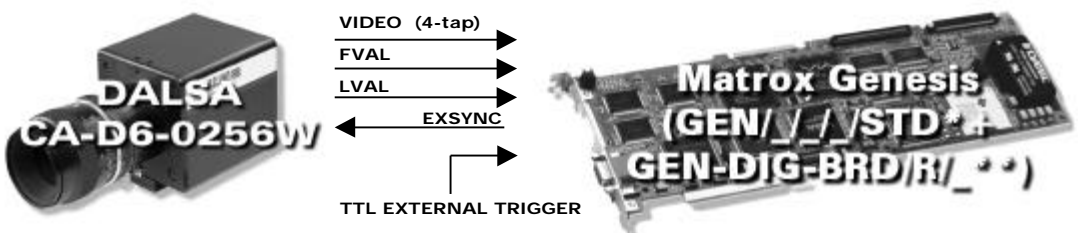


# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

**DALSA CA-D6-0256W (MotionVision)**

**February 25, 1999**

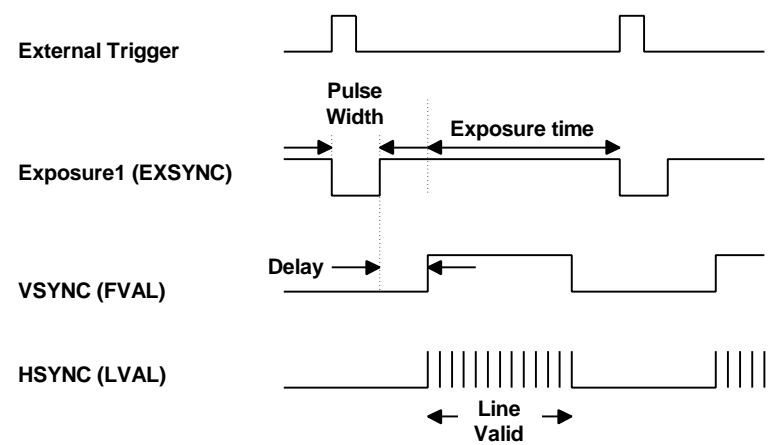
<b>Camera Descriptions</b>	<ul style="list-style-type: none"> <li>• 260 × 256 × 8-bit @ up to 955fps.</li> <li>• 4-channel LVDS/RS-422 digital video.</li> <li>• Progressive scan.</li> <li>• External synchronization required.</li> <li>• Exposure control.</li> <li>• Pixel clock rate: 25 MHz.</li> </ul>
<b>Interface modes</b>	<ul style="list-style-type: none"> <li>• Continuous, Trigger mode</li> </ul>
<b>Camera Interface Briefs</b>	<p><b>Mode 1: Continuous</b></p>  <p>*Matrox Genesis Main Board with Grab Module  **Matrox RS-422 Digital Data Input Board</p> <ul style="list-style-type: none"> <li>• 260 × 258 × 8-bit @ 850fps.</li> <li>• 4-channel RS-422 digital video.</li> <li>• Progressive scan.</li> <li>• Continuous video.</li> <li>• Matrox Genesis sending periodic RS-422 EXPOSURE 1 (EXSYNC) signals to camera.</li> <li>• Matrox Genesis receiving HSYNC (LVAL), VSYNC (FVAL) and video signals from camera.</li> <li>• DCF used: <a href="#">CAD6256W.DCF</a></li> </ul> <p><b>Mode 2: Trigger mode</b></p>  <p>*Matrox Genesis Main Board with Grab Module  **Matrox RS-422 Digital Data Input Board</p> <ul style="list-style-type: none"> <li>• 260 × 258 × 8-bit.</li> <li>• 4-channel RS-422 digital video.</li> <li>• Progressive scan.</li> <li>• Matrox Genesis receiving TTL external trigger.</li> <li>• Matrox Genesis sending periodic RS-422 EXPOSURE 1 (EXSYNC) signals to camera.</li> <li>• Matrox Genesis receiving HSYNC (LVAL), VSYNC (FVAL) and video signals from camera.</li> <li>• DCF used: <a href="#">CAD6256T.DCF</a></li> </ul>

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

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<b>Camera Interface Details</b>	<p><b>Mode 1: Continuous</b></p> <ul style="list-style-type: none"> <li>• <b>Frame rate:</b> The frame rate is determined by the frequency of the EXPOSURE1 (EXSYNC) signals. The maximum possible frame rate for acquisition to on-board memory is 850 frames per second, while the maximum for acquisition to host memory using a double buffer function is 565 frames per second.</li> <li>• <b>Exposure time:</b> The active period of EXPOSURE1 (EXSYNC) signals is the exposure time. The default exposure time for this DCF is <b>1.56 ms</b>. In order to change the exposure time, the width and deployment time of EXPOSURE1 (EXSYNC) must be set in Matrox Intellicam. Consult the Matrox Intellicam User Guide for more information.</li> <li>• <b>Minimum Exposure time:</b> the minimum exposure time is equal to <b>1.01 ms</b>.</li> </ul> <p><b>Mode 2: Trigger mode</b></p> <ul style="list-style-type: none"> <li>• Once it has received the external trigger signal, Matrox Genesis sends the RS-422 EXPOSURE1 (EXSYNC) signal to the camera following a delay that is equal to the desired exposure time. A short (variable) delay will follow after receiving the EXPOSURE1 (EXSYNC), followed by the camera sending the VSYNC (FVAL) and HSYNC (LVAL) signals to the Matrox Genesis to initiate frame and line readout.</li> <li>• <b>Frame rate:</b> The frame rate is determined by the frequency of the external trigger signal.</li> <li>• <b>Exposure time:</b> The active period of EXPOSURE1 (EXSYNC) signals is the exposure time. In order to change the width and deployment time of EXPOSURE1 (EXSYNC) use the Exposure Settings menu tab in Matrox Intellicam. Consult the Matrox Intellicam User Guide for more information.</li> <li>• <b>Minimum Exposure width:</b> the minimum EXPOSURE1 (EXSYNC) pulse width is equal to <b>100ns</b></li> </ul>  <p>The diagram illustrates the timing sequence for Mode 2 (Trigger mode). It shows four signals over time:     <ul style="list-style-type: none"> <li><b>External Trigger:</b> A periodic square wave pulse.</li> <li><b>Exposure1 (EXSYNC):</b> A pulse that occurs after a delay from the External Trigger. The pulse width is labeled 'Pulse Width' and the duration of the active period is labeled 'Exposure time'.</li> <li><b>VSYNC (FVAL):</b> A signal that occurs after a 'Delay' from the start of the EXSYNC pulse. It is a single pulse per frame.</li> <li><b>HSYNC (LVAL):</b> A series of vertical lines representing horizontal sync pulses. The period between the start of these pulses is labeled 'Line Valid'.</li> </ul> </p>
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# Application Note:

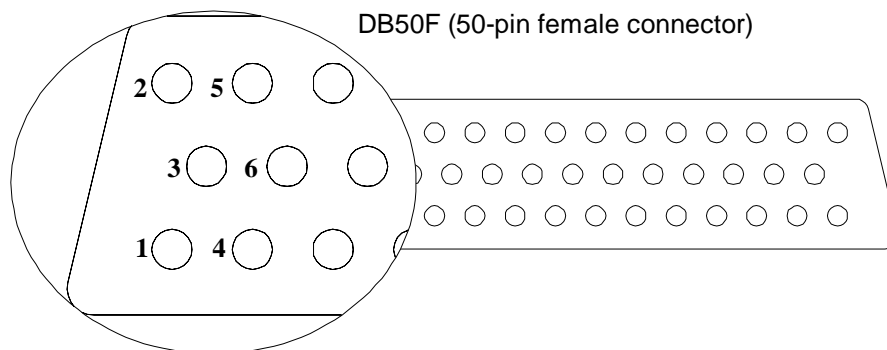
## Interfacing non-standard cameras to Matrox Genesis

**DALSA CA-D6-0256W (MotionVision)**

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### Cabling Requirements

**DB50F connector:** The 50-pin female connector (DB50F) on this camera model is configured with an uncommon pin number pattern of 1-3-2, 4-6-5, etc. Refer to the camera manual for additional information.



### Mode 1: Continuous

- DBHD100-TO-OPEN cable and GEN/DIG/BRD/R board required for digital data, synchronization and control signals in RS-422 format.
- Connections between the DB-50 triple-row 50-pin connector (**OS1/ OS2**) of the camera, a jumper connector, and the 100-pin connector of the GEN-DIG-BRD/R are as follows:

#### DALSA CA-D6-0256W

(50-pin triple-row connector - OS1)

#### GEN-DIG-BRD/R

(100-pin connector)

Pin name	DALSA Pin no.	Connector Pin no.		Pin name	Pin no.
OS1D7 (MSB)	21	24	→	DATA, INPUT, 7+	15
OS1D7B	22	08	→	DATA, INPUT, 7-	16
OS1D6	23	41	→	DATA, INPUT, 6+	13
OS1D6B	24	25	→	DATA, INPUT, 6-	14
OS1D5	25	09	→	DATA, INPUT, 5+	11
OS1D5B	26	42	→	DATA, INPUT, 5-	12
OS1D4	27	26	→	DATA, INPUT, 4+	09
OS1D4B	28	10	→	DATA, INPUT, 4-	10
OS1D3	29	43	→	DATA, INPUT, 3+	07
OS1D3B	30	27	→	DATA, INPUT, 3-	08
OS1D2	31	11	→	DATA, INPUT, 2+	05
OS1D2B	32	44	→	DATA, INPUT, 2-	06
OS1D1	33	28	→	DATA, INPUT, 1+	03
OS1D1B	34	12	→	DATA, INPUT, 1-	04
OS1D0	35	45	→	DATA, INPUT, 0+	01
OS1D0B	36	29	→	DATA, INPUT, 0-	02

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

**DALSA CA-D6-0256W (MotionVision)**

**February 25, 1999**

<b>Cabling Requirements (continued)</b>	<ul style="list-style-type: none"> <li>Connections between the DB-50 triple-row 50-pin connector (<b>OS1/ OS2</b>) of the camera and the 100-pin connector of the GEN-DIG-BRD/R are as follows:</li> </ul>				
	<b>DALSA CA-D6-0256W</b> <b>(50-pin triple-row connector – OS2)</b>		<b>GEN-DIG-BRD/R</b> <b>(100-pin connector)</b>		
	<b>Pin name</b>	<b>DALSA Pin no.</b>	<b>Connector Pin no.</b>	<b>Pin name</b>	<b>Pin no.</b>
	OS2D7 (MSB)	01	01	→ DATA, INPUT, 15+	31
	OS2D7B	02	34	→ DATA, INPUT, 15-	32
	OS2D6	03	18	→ DATA, INPUT, 14+	29
	OS2D6B	04	02	→ DATA, INPUT, 14-	30
	OS2D5	05	35	→ DATA, INPUT, 13+	27
	OS2D5B	06	19	→ DATA, INPUT, 13-	28
	OS2D4	07	03	→ DATA, INPUT, 12+	25
	OS2D4B	08	36	→ DATA, INPUT, 12-	26
	OS2D3	09	20	→ DATA, INPUT, 11+	23
	OS2D3B	10	04	→ DATA, INPUT, 11-	24
	OS2D2	11	37	→ DATA, INPUT, 10+	21
	OS2D2B	12	21	→ DATA, INPUT, 10-	22
	OS2D1	13	05	→ DATA, INPUT, 9+	19
	OS2D1B	14	38	→ DATA, INPUT, 9-	20
	OS2D0	15	22	→ DATA, INPUT, 8+	17
	OS2D0B	16	06	→ DATA, INPUT, 8-	18
	STROBE	37	13	→ CLOCK, INPUT, -	39
	STROBEB	38	46	→ CLOCK, INPUT, +	40
	FVAL	17	39	→ VSYNC, INPUT, +	35
	FVALB	18	23	→ VSYNC, INPUT, -	36
	LVAL	39	30	→ HSYNC, INPUT, +	33
	LVALB	40	14	→ HSYNC, INPUT, -	34
Connections between the DB-50 triple-row 50-pin connector ( <b>OS3/ OS4</b> ) of the camera and the 100-pin connector of the GEN-DIG-BRD/R are as follows:					
	<b>DALSA CA-D6-0256W</b> <b>(50-pin triple-row connector – OS3)</b>		<b>GEN-DIG-BRD/R</b> <b>(100-pin connector)</b>		
	<b>Pin name</b>	<b>DALSA Pin no.</b>	<b>Connector Pin no.</b>	<b>Pin name</b>	<b>Pin no.</b>
	OS3D7 (MSB)	21	24	→ DATA, INPUT, 23+	65
	OS3D7B	22	08	→ DATA, INPUT, 23-	66
	OS3D6	23	41	→ DATA, INPUT, 22+	63
	OS3D6B	24	25	→ DATA, INPUT, 22-	64
	OS3D5	25	09	→ DATA, INPUT, 21+	61
	OS3D5B	26	42	→ DATA, INPUT, 21-	62
	OS3D4	27	26	→ DATA, INPUT, 20+	59
	OS3D4B	28	10	→ DATA, INPUT, 20-	60
	continued				

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

**DALSA CA-D6-0256W (MotionVision)**
**February 25, 1999**

<b>Cabling Requirements (continued)</b>	<b>DALSA CA-D6-0256W (50-pin triple-row connector – OS3)</b>			<b>GEN-DIG-BRD/R (100-pin connector)</b>	
	<b>Pin name</b>	<b>DALSA Pin no.</b>	<b>Connector Pin no.</b>	<b>Pin name</b>	<b>Pin no.</b>
	OS3D3	29	43	→ DATA, INPUT, 19+	57
	OS3D3B	30	27	→ DATA, INPUT, 19-	58
	OS3D2	31	11	→ DATA, INPUT, 18+	55
	OS3D2B	32	44	→ DATA, INPUT, 18-	56
	OS3D1	33	28	→ DATA, INPUT, 17+	53
	OS3D1B	34	12	→ DATA, INPUT, 17-	54
	OS3D0	35	45	→ DATA, INPUT, 16+	51
	OS3D0B	36	29	→ DATA, INPUT, 16-	52
	• Connections between the DB-50 triple-row 50-pin connector ( <b>OS3/ OS4</b> ) of the camera and the 100-pin connector of the GEN-DIG-BRD/R are as follows:				
	<b>DALSA CA-D6-0256W (50-pin triple-row connector – OS4)</b>			<b>GEN-DIG-BRD/R (100-pin connector)</b>	
	<b>Pin name</b>	<b>DALSA Pin no.</b>	<b>Connector Pin no.</b>	<b>Pin name</b>	<b>Pin no.</b>
	OS4D7 (MSB)	01	01	→ DATA, INPUT, 31+	81
	OS4D7B	02	34	→ DATA, INPUT, 31-	82
	OS4D6	03	18	→ DATA, INPUT, 30+	79
	OS4D6B	04	02	→ DATA, INPUT, 30-	80
	OS4D5	05	35	→ DATA, INPUT, 29+	77
	OS4D5B	06	19	→ DATA, INPUT, 29-	78
	OS4D4	07	03	→ DATA, INPUT, 28+	75
	OS4D4B	08	36	→ DATA, INPUT, 28-	76
	OS4D3	09	20	→ DATA, INPUT, 27+	73
	OS4D3B	10	04	→ DATA, INPUT, 27-	74
	OS4D2	11	37	→ DATA, INPUT, 26+	71
	OS4D2B	12	21	→ DATA, INPUT, 26-	72
	OS4D1	13	05	→ DATA, INPUT, 25+	69
	OS4D1B	14	38	→ DATA, INPUT, 25-	70
	OS4D0	15	22	→ DATA, INPUT, 24+	67
	OS4D0B	16	06	→ DATA, INPUT, 24-	68
	• Connections between the DB-15F (control) connector on the rear panel of the camera and the 100-pin connector of the GEN-DIG-BRD/R are as follows:				
	<b>DALSA CA-D6-0256W (DB15 female connector)</b>			<b>GEN-DIG-BRD/R (100-pin connector)</b>	
	<b>Pin name</b>	<b>Pin no.</b>		<b>Pin name</b>	<b>Pin no.</b>
	EXSYNC	12	←	EXPOSURE, OUTPUT, 1+	95
	EXSYNC B	04	←	EXPOSURE, OUTPUT, 1-	96
	PRIN	05	←	EXPOSURE, OUTPUT, 2+	97
	PRINB	13	←	EXPOSURE, OUTPUT, 2-	98

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

DALSA CA-D6-0256W (MotionVision)

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### Cabling Requirements (continued)

- Connections between the DB-15F (power) connector on the rear panel of the camera and the power supply are as follows:

#### DALSA CA-D6-0256W

(50-pin triple-row connector – OS4)

#### Power Supply (Vision 1)

Pin name	Pin no.		Pin name	Pin no.
DGND	01	→	GND	04
+5V DIGITAL	02	→	+5V	03
-5V DIGITAL	04	→	-5V	06
+15V	06	→	+15V	09
+15V	07	→	+15V	09
AGND	08	→	GND	05
+5V DIGITAL	09	→	+5V	03
DGND	10	→	GND	07
-15V	12	→	-15V	01
-5V ANALOG	13	→	-5V	06
AGND	14	→	GND	07
+5V ANALOG	15	→	+5V	03

**NOTE:** it is very important that all the GROUNDs of the camera be connected together to the POWER SUPPLY GROUND, and to the GROUND of the Matrox Genesis. Do not use the cable shield as a ground; instead always use the ground pin of the power supply

#### Mode 2: Trigger mode

- DBHD100-TO-OPEN and IMG-7W2-TO-5BNC cables, and GEN/DIG/BRD/R board required for digital data, synchronization and control signals in RS-422 format.
- TTL external trigger source should be connected to the TTL trigger input of IMG-7W2-TO-5BNC cable.
- All other connections are as in Mode 1: *Continuous*

The DCF(s) mentioned in this application note can be found on the MIL and Native Library CD, or our FTP site ([ftp.matrox.com](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

**Sales Offices:**  
**U.K.**  
**Matrox (UK) Ltd.**  
 Sefton Park, Stoke Poges  
 Buckinghamshire  
 U.K. SL2 4JS  
 Tel: +44 (0) 1753 665500  
 Fax: +44 (0) 1753 665599

**France**  
**Matrox France SARL**  
 2, rue de la Couture,  
 Silic 225  
 94528 Rungis Cedex  
 Tel: (0) 1 45-60-62-00  
 Fax: (0) 1 45-60-62-05

**Germany**  
**Matrox GmbH**  
 Inselkammerstr.8  
 D-82008  
 Unterhaching  
 Germany  
 Tel: 089/614 4740  
 Fax: 089/614 9743

**Asia Pacific**  
**Matrox Asia Liaison Office**  
 Rm. 1901, 19/F, Workington  
 Tower,  
 78 Bonham Strand E.,  
 Sheung Wan, Hong Kong.  
 Tel: 852.2877.5387  
 Fax: 852.2537.9530

