Matrox Genesis
Camera Interface Application Note
DALSTAR DS-4x-65K955 January 28, 2003

Basics about the camera

Camera Descriptions

- 260 × 256 × 8-bit @ up to 955 fps.
- Four channel LVDS digital video output.
- Progressive scan.
- External sync.
- External exposure control.
- 12 MHz pixel clock rate.

Mode of operations as per Matrox Imaging (in parentheses as per camera manufacturer)

Interface Modes

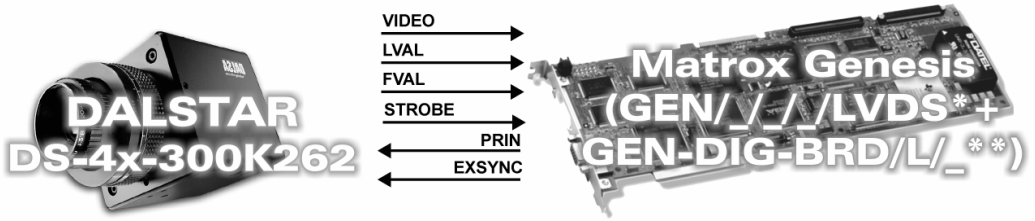
- Continuous (Free run)
- Trigger (Snapshot operation)

Basics about the interface modes

Camera Interface Briefs

Mode 1: Continuous

- 256 × 252 × 8-bit @ 955 fps.
- Four channel LVDS digital video.
- Progressive scan.
- Matrox Genesis sending periodic EXPOSURE1 (EXSYNC) and EXPOSURE2 (PRIN) signals to camera.
- Matrox Genesis receiving HSYNC (LVAL), VSYNC (FVAL), PIXEL CLOCK (STROBE) and video signals from camera.
- DCF used: CAD6256W.DCF



Mode 2: Trigger

- 256 × 252 × 8-bit.
- Four channel LVDS digital video.
- Progressive scan.
- Matrox Genesis receiving external OPTO trigger signal.
- Matrox Genesis sending periodic EXPOSURE1 (EXSYNC) and EXPOSURE2 (PRIN) signals to camera.
- Matrox Genesis receiving HSYNC (LVAL), VSYNC (FVAL), PIXEL CLOCK (STROBE) and video signals from camera.

***Matrox Genesis main board with grab module**
****Matrox LVDS digital data input board**

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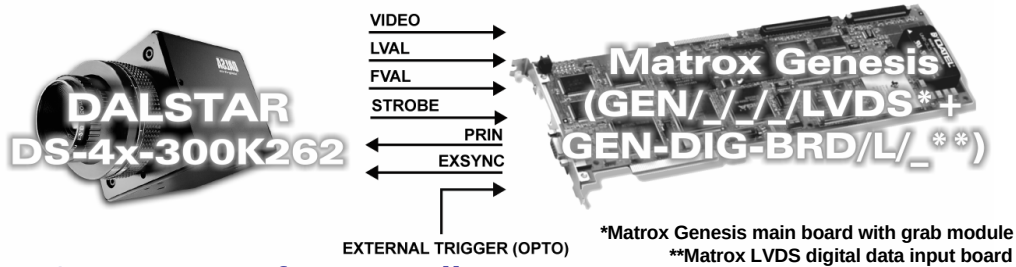
Basics about the interface modes

Camera Interface Briefs (continued)

Mode 2: Trigger (Snapshot operation)

- DCF used: CAD6256T.DCF



*Matrox Genesis main board with grab module
**Matrox LVDS digital data input board

Specifics about the interface modes

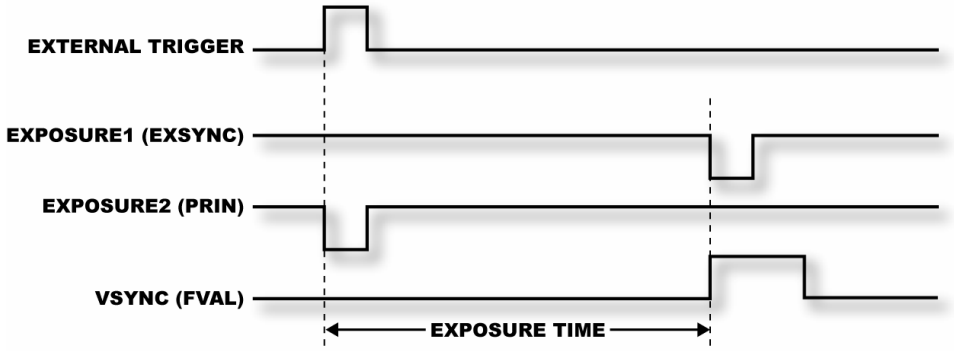
Camera Interface Details

Mode 1: Continuous

- **Frame Rate:** In this mode the camera operates at a fixed maximum frame rate. The maximum possible frame rate of 955 frames per second can be achieved if acquisition is performed to on-board memory without copy to display.
- **Exposure time:** In this mode the camera operates at a fixed maximum exposure time (equal to one frame time). EXPOSURE1 (EXSYNC) signal remains in a low state and EXPOSURE2 (PRIN) signal remains in a high state at all times.

Mode 2: Trigger (Snapshot operation)

- **Frame rate**: The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The period between falling edges of EXPOSURE2 (PRIN) and EXPOSURE1 (EXSYNC) signals is the exposure time. The exposure time can be modified in the DCF using Matrox Intellicam, Genesis Native Library (GNL) imCamControl() or with the MIL MdigControl() function. Consult the respective manual for more information.
- **Timing diagram:**



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Cabling details for the interface modes

Cabling Requirements

Mode 1: Continuous

- **Cable:** DBHD100-TO-OPEN (open ended) cable required for video, synchronization and control signals.
- **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.
- **Connection:** Connections between the 50-pin connector (**OS1/OS2**) of the camera, a jumper connector and the 100-pin connector of the Matrox Genesis are as follows:

DALSTAR DS-4X-65K955 (50-pin connector- OS1)				**GEN-DIG-BRD/L/_ (100-pin connector)**	
Pin name	***Pin no.****	***Jumper Pin.*** **		***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
DALSTAR DS-4X-65K955 (50-pin connector- OS2)				**GEN-DIG-BRD/L/_ (100-pin connector)**	
Pin name	***Pin no.****	***Jumper Pin****		***Pin name***	***Pin no.***
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

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* DALSA Crimp Label ** Connector Solder Label

Cabling details for the interface modes

Cabling Requirements (continued)

Mode 1: Continuous

DALSTAR DS-4X-65K955 (50-pin connector- OS2)				GEN-DIG-BRD/L/_ (100-pin connector)	
Pin name	***Pin no.****	***Jumper Pin****		***Pin name***	***Pin no.***
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

- **Connection:** Connections between the 50-pin connector (**OS3/OS4**) of the camera, a jumper connector and the 100-pin connector of the Matrox Genesis are as follows:

DALSTAR DS-4X-65K955 (50-pin connector- OS3)				GEN-DIG-BRD/L/_ (100-pin connector)	
Pin name	***Pin no.****	***Jumper Pin****		***Pin name***	***Pin no.***
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
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

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* DALSA Crimp Label ** Connector Solder Label

Cabling details for the interface modes

Cabling Requirements (continued)

Mode 1: Continuous

DALSTAR DS-4X-65K955 (50-pin connector- OS4)				GEN-DIG-BRD/L/_ (100-pin connector)	
Pin name	***Pin no.****	***Jumper Pin****		***Pin name***	***Pin no.***
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

- **Connection:** Connections between the DB-15F (control) connector on the rear panel of the camera and the 100-pin Digital Interface connector of Matrox Genesis are as follows:

DALSTAR DS-4X-65K955 (DB15 female connector)			GEN-DIG-BRD/L/_ (100-pin connector)	
Pin name	***Pin no.****		***Pin name***	***Pin no.***
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

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

DALSTAR DS-4X-65K955 (15-pin power connector)			POWER SUPPLY (VISION1)	
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

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* DALSA Crimp Label ** Connector Solder Label

Cabling details for the interface modes

Cabling Requirements (Continued)

Mode 1: Continuous

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

DALSTAR DS-4X-65K955 (15-pin power connector)			**POWER SUPPLY (VISION1)**	
Pin name	***Pin no.****		***Pin name***	***Pin no.***
+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

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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 (Snapshot operation)

- **Cable:** DBHD100-TO-OPEN (open ended) and IMG-7W2-TO-5BNC cables required for video, synchronization and control signals.
- **External Trigger:** External OPTO trigger source should be connected to the Trigger Input of the IMG-7W2-TO-5BNC cable (gray BNC).
- **DB50F connector:** See Mode 1: *Continuous.*
- **Connection:** All other connections are as in Mode 1: *Continuous.*

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