

Matrox Odyssey Xpro

Camera Interface Application Note

DALSA DS-4x-65K955

January 5, 2004

Basics about the
camera

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

Basics about the
interface modes

Camera Descriptions

- Effective Resolution: $260 \times 260 \times 8\text{-bit}$ @ up to 955 fps.
- LVDS digital video output (Quad tap).
- Progressive scan.
- External sync.
- External exposure control.
- 25 MHz pixel clock rate.

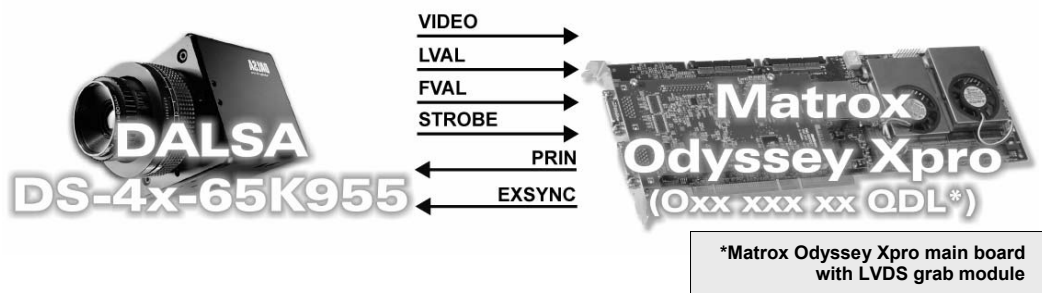
Interface Modes

- Continuous (Free Running)
- Pseudo-continuous (User Control)
- Asynchronous reset (User Controlled EXSYNC and PRIN)

Camera Interface Briefs

Mode 1: Continuous

- $260 \times 260 \times 8\text{-bit}$ @ 955 fps.
- LVDS digital video (Quad tap).
- Progressive scan.
- Matrox Odyssey Xpro sending TIMER1 (EXSYNC) and TIMER2 (PRIN) signals to camera.
- Matrox Odyssey Xpro receiving HSYBC (LVAL), VSYNC (FVAL), PIXEL CLOCK (STROBE) and video signals from camera.
- DCF: [DS4x65K955_260x260_8bitCon.DCF](#)



Mode 2: Pseudo-continuous

- $260 \times 260 \times 8\text{-bit}$.
- LVDS digital video (Quad tap).
- Progressive scan.
- Matrox Odyssey Xpro sending periodic TIMER1 (EXSYNC) and TIMER2 (PRIN) signals to camera.
- Matrox Odyssey Xpro receiving HSYBC (LVAL), VSYNC (FVAL), PIXEL CLOCK (STROBE) and video signals from camera.

Continued...

Matrox Odyssey Xpro

Camera Interface Application Note

DALSA DS-4x-65K955

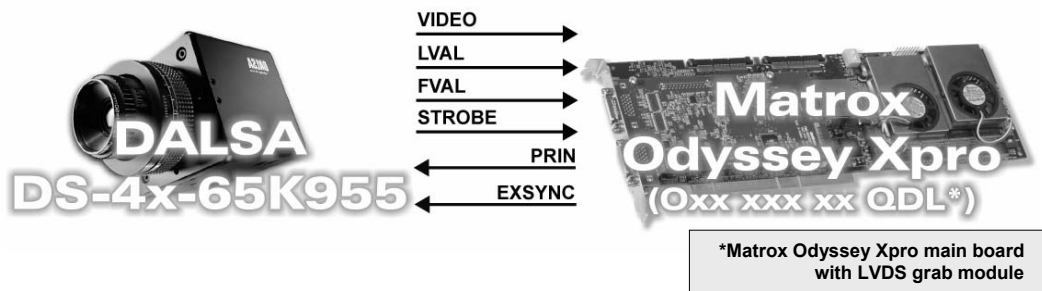
January 5, 2004

Basics about the
interface modes

Camera Interface Briefs (continued)

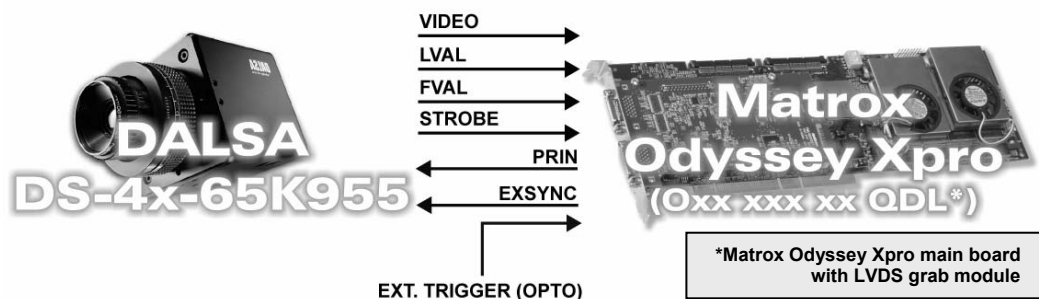
Mode 2: Pseudo-continuous

- DCF: [DS4x65K955_260x260_8bitAsync.DCF](#)



Mode 3: Asynchronous reset

- 260 × 260 × 8-bit.
- LVDS digital video (Quad tap).
- Progressive scan.
- Matrox Odyssey Xpro receiving external OPTO trigger signal.
- Matrox Odyssey Xpro sending TIMER1 (EXSYNC) and TIMER2 (PRIN) signals to camera.
- Matrox Odyssey Xpro receiving HSYNC (LVAL), VSYNC (FVAL), PIXEL CLOCK (STROBE) and video signals from camera.
- DCF: [DS4x65K955_260x260_8bitAsync.DCF](#)



Specifics about the
interface modes

Camera Interface Details

Mode 1: Continuous

- **Frame Rate:** Matrox Odyssey Xpro receives the continuous video from the camera at 955 frames per second.
- **Exposure time:** Exposure time is fixed and set to the maximum (equal to one frame time). Refer to the camera manual for more information.

Matrox Odyssey Xpro

Camera Interface Application Note

DALSA DS-4x-65K955

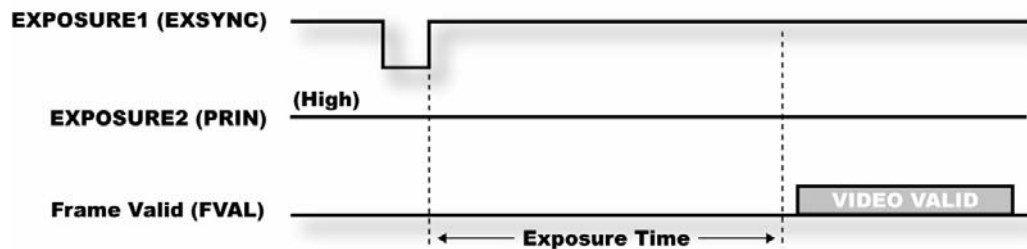
January 5, 2004

Specifics about the
interface modes

Camera Interface Details

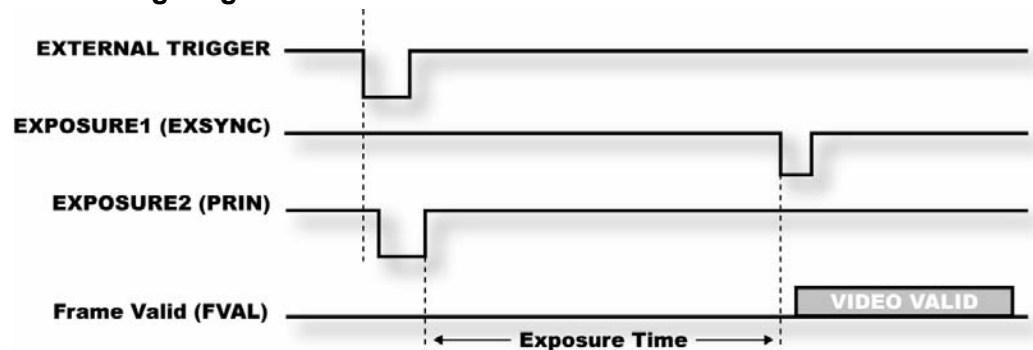
Mode 2: Pseudo-continuous

- **Frame Rate:** The frame rate is determined by the frequency of the periodic TIMER1 (EXSYNC) signal.
- **Exposure time:** Exposure time is fixed and set to the maximum (equal to one frame time). Refer to the camera manual for more information.
- **Timing diagram:**



Mode 3: Asynchronous Reset

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



Matrox Odyssey Xpro

Camera Interface Application Note

DALSA DS-4x-65K955

January 5, 2004

*Cabling details for
the interface modes*

Cabling Requirements

Modes 1 and 2: Continuous/Pseudo-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 (**CH0**) of the Matrox Odyssey Xpro LVDS grab module are as follows:

DALSA DS-4x-65K955 (50-pin connector- OS1)				Odyssey Xpro LVDS grab module (100-pin connector – CH0)	
Pin name	Pin no.*	Jumper Pin**		Pin name	Pin no.
OS1D7 (MSB)	21	24	→	P0_LVDS_DATA_IN_7+	15
OS1D7B	22	08	→	P0_LVDS_DATA_IN_7-	16
OS1D6	23	41	→	P0_LVDS_DATA_IN_6+	13
OS1D6B	24	25	→	P0_LVDS_DATA_IN_6-	14
OS1D5	25	09	→	P0_LVDS_DATA_IN_5+	11
OS1D5B	26	42	→	P0_LVDS_DATA_IN_5-	12
OS1D4	27	26	→	P0_LVDS_DATA_IN_4+	09
OS1D4B	28	10	→	P0_LVDS_DATA_IN_4-	10
OS1D3	29	43	→	P0_LVDS_DATA_IN_3+	07
OS1D3B	30	27	→	P0_LVDS_DATA_IN_3-	08
OS1D2	31	11	→	P0_LVDS_DATA_IN_2+	05
OS1D2B	32	44	→	P0_LVDS_DATA_IN_2-	06
OS1D1	33	28	→	P0_LVDS_DATA_IN_1+	03
OS1D1B	34	12	→	P0_LVDS_DATA_IN_1-	04
OS1D0	35	45	→	P0_LVDS_DATA_IN_0+	01
OS1D0B	36	29	→	P0_LVDS_DATA_IN_0-	02
DALSA DS-4X-65K955 (50-pin connector- OS2)				Odyssey Xpro LVDS grab module (100-pin connector – CH0)	
Pin name	Pin no.*	Jumper Pin**		Pin name	Pin no.
OS2D7 (MSB)	01	01	→	P0_LVDS_DATA_IN_15+	31
OS2D7B	02	34	→	P0_LVDS_DATA_IN_15-	32
OS2D6	03	18	→	P0_LVDS_DATA_IN_14+	29
OS2D6B	04	02	→	P0_LVDS_DATA_IN_14-	30
OS2D5	05	35	→	P0_LVDS_DATA_IN_13+	27
OS2D5B	06	19	→	P0_LVDS_DATA_IN_13-	28
OS2D4	07	03	→	P0_LVDS_DATA_IN_12+	25
OS2D4B	08	36	→	P0_LVDS_DATA_IN_12-	26
OS2D3	09	20	→	P0_LVDS_DATA_IN_11+	23
OS2D3B	10	04	→	P0_LVDS_DATA_IN_11-	24

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* DALSA Crimp Label ** Connector Solder Label

Matrox Odyssey Xpro

Camera Interface Application Note

DALSA DS-4x-65K955

January 5, 2004

Cabling details for
the interface modes

Cabling Requirements (continued)

Modes 1 and 2: Continuous/Pseudo-continuous

DALSA DS-4X-65K955
(50-pin connector- OS2)

Odyssey Xpro LVDS grab module
(100-pin connector – CH0)

<i>Pin name</i>	<i>Pin no.*</i>	<i>Jumper Pin **</i>		<i>Pin name</i>	<i>Pin no.</i>
OS2D2	11	37	→	P0_LVDS_DATA_IN_10+	21
OS2D2B	12	21	→	P0_LVDS_DATA_IN_10-	22
OS2D1	13	05	→	P0_LVDS_DATA_IN_9+	19
OS2D1B	14	38	→	P0_LVDS_DATA_IN_9-	20
OS2D0	15	22	→	P0_LVDS_DATA_IN_8+	17
OS2D0B	16	06	→	P0_LVDS_DATA_IN_8-	18
STROBE	37	13	→	P0_LVDS_CLK_IN+	39
STROBEB	38	46	→	P0_LVDS_CLK_IN-	40
FVAL	17	39	→	P0_LVDS_AUX(VSYNC)_IN_0+	35
FVALB	18	23	→	P0_LVDS_AUX(VSYNC)_IN_0-	36
LVAL	39	30	→	P0_LVDS_HSYNC_IN+	33
LVALB	40	14	→	P0_LVDS_HSYNC_IN-	34

- **Connection:** Connections between the 50-pin connector (**OS3/OS4**) of the camera, a jumper connector and the 100-pin connector (**CH1**) of the Matrox Odyssey Xpro LVDS grab module are as follows:

DALSA DS-4X-65K955
(50-pin connector- OS2)

Odyssey Xpro LVDS grab module
(100-pin connector – CH1)

<i>Pin name</i>	<i>Pin no.*</i>	<i>Jumper Pin **</i>		<i>Pin name</i>	<i>Pin no.</i>
OS3D7 (MSB)	21	24	→	P1_LVDS_DATA_IN_7+	65
OS3D7B	22	08	→	P1_LVDS_DATA_IN_7-	66
OS3D6	23	41	→	P1_LVDS_DATA_IN_6+	63
OS3D6B	24	25	→	P1_LVDS_DATA_IN_6-	64
OS3D5	25	09	→	P1_LVDS_DATA_IN_5+	61
OS3D5B	26	42	→	P1_LVDS_DATA_IN_5-	62
OS3D4	27	26	→	P1_LVDS_DATA_IN_4+	59
OS3D4B	28	10	→	P1_LVDS_DATA_IN_4-	60
OS3D3	29	43	→	P1_LVDS_DATA_IN_3+	57
OS3D3B	30	27	→	P1_LVDS_DATA_IN_3-	58
OS3D2	31	11	→	P1_LVDS_DATA_IN_2+	55
OS3D2B	32	44	→	P1_LVDS_DATA_IN_2-	56
OS3D1	33	28	→	P1_LVDS_DATA_IN_1+	53
OS3D1B	34	12	→	P1_LVDS_DATA_IN_1-	54
OS3D0	35	45	→	P1_LVDS_DATA_IN_0+	51
OS3D0B	36	29	→	P1_LVDS_DATA_IN_0-	52

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* DALSA Crimp Label ** Connector Solder Label

Matrox Odyssey Xpro

Camera Interface Application Note

DALSA DS-4x-65K955

January 5, 2004

Cabling details for the
interface modes

Cabling Requirements (continued)

Modes 1 and 2: Continuous/Pseudo-continuous

DALSA DS-4X-65K955
(50-pin connector- OS4)

Odyssey Xpro LVDS grab module
(100-pin connector – CH1)

<i>Pin name</i>	<i>Pin no.*</i>	<i>Jumper Pin**</i>		<i>Pin name</i>	<i>Pin no.</i>
OS4D7 (MSB)	01	01	→	P1_LVDS_DATA_IN_15+	81
OS4D7B	02	34	→	P1_LVDS_DATA_IN_15-	82
OS4D6	03	18	→	P1_LVDS_DATA_IN_14+	79
OS4D6B	04	02	→	P1_LVDS_DATA_IN_14-	80
OS4D5	05	35	→	P1_LVDS_DATA_IN_13+	77
OS4D5B	06	19	→	P1_LVDS_DATA_IN_13-	78
OS4D4	07	03	→	P1_LVDS_DATA_IN_12+	75
OS4D4B	08	36	→	P1_LVDS_DATA_IN_12-	76
OS4D3	09	20	→	P1_LVDS_DATA_IN_11+	73
OS4D3B	10	04	→	P1_LVDS_DATA_IN_11-	74
OS4D2	11	37	→	P1_LVDS_DATA_IN_10+	71
OS4D2B	12	21	→	P1_LVDS_DATA_IN_10-	72
OS4D1	13	05	→	P1_LVDS_DATA_IN_9+	69
OS4D1B	14	38	→	P1_LVDS_DATA_IN_9-	70
OS4D0	15	22	→	P1_LVDS_DATA_IN_8+	67
OS4D0B	16	06	→	P1_LVDS_DATA_IN_8-	68

- **Connection:** Connections between the DB-15F (control) connector on the rear panel of the camera and the 100-pin Digital Interface connector (**CH0**) of Matrox Odyssey Xpro LVDS grab module are as follows:

DALSA DS-4X-65K955
(DB15 female connector)

Odyssey Xpro LVDS grab module
(100-pin connector – CH0)

<i>Pin name</i>	<i>Pin no.*</i>		<i>Pin name</i>	<i>Pin no.</i>
EXSYNC	12	←	P0_LVDS/TTL_AUX(EXP)_OUT_3+	45
EXSYNC B	04	←	P0_LVDS/TTL_AUX(EXP)_OUT_3 -	46
PRIN	05	←	P0_LVDS/TTL_AUX(EXP)_OUT_4+	47
PRINB	13	←	P0_LVDS_AUX(EXP)_OUT_4-	48

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

DALSA DS-4X-65K955
(15-pin power connector)

POWER SUPPLY
(VISION1)

<i>Pin name</i>	<i>Pin no.*</i>		<i>Pin name</i>	<i>Pin no.</i>
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

Matrox Odyssey Xpro

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DALSA DS-4x-65K955

January 5, 2004

Cabling details for the
interface modes

Cabling Requirements (Continued)

Modes 1 and 2: Continuous/Pseudo-continuous

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

DALSA 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

* DALSA Crimp Label

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 3: Asynchronous reset

- **Cable:** DBHD100-TO-OPEN (open ended) cable required for video, synchronization and control signals.
- **External Trigger:** External OPTO trigger source should be connected to the 9-pin External Auxiliary I/O connector of Matrox Odyssey Xpro LVDS grab module (pin 7 and pin 2, P3_OPTO_AUX(TRIG)_IN_0+ and P3_OPTO_AUX(TRIG)_IN_0- respectively).
- **Connection:** All other connections are as in Mode 1: *Continuous*

The DCFs mentioned in this application note are also attached (embedded) to this PDF file – use the Adobe Reader's View File Attachment to access the DCF files. 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. © Matrox Electronic Systems Ltd, 2004-2011.

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ODY-CID-048

