

Matrox Genesis

Camera Interface Application Note

REDLAKE MASD (KODAK) ES4.0

March 20, 2002

Basics about the
camera

Camera Descriptions

- Up to $2048 \times 2048 \times 8$ -bit @ up to 30 fps.
- Single or dual channel LVDS digital video output.
- Progressive scan.
- Internal or external sync.
- Internal or external exposure control.
- 20 MHz pixel clock rate.

Interface Modes

- Continuous/Pseudo-continuous
- Asynchronous reset (Control, Trigger)

Camera Interface Briefs

Mode 1: Continuous/Pseudo-continuous

- Up to $2048 \times 2048 \times 8$ -bit @ up to 30 fps.
- Single or dual channel LVDS digital video.
- Progressive scan.
- Matrox Genesis receiving HSYNC (LINE ENABLE), VSYNC (FRAME ENABLE), PIXEL CLOCK (PIX DATA @ 20 MHz) and video from camera.
- DCF used: [ES4C1K1T.DCF](#) (single, 1024×1024 @ 15/8 fps)
- DCF used: [ES4C1K2T.DCF](#) (dual, 1024×1024 @ 30/15/8 fps)
- DCF used: [ES4C2K1T.DCF](#) (single, 2048×2048 @ 8/4 fps)
- DCF used: [ES4C2K2T.DCF](#) (dual, 2048×2048 @ 15/8/4 fps)



Mode 2: Asynchronous Reset (Trigger, Control)

- Up to $2048 \times 2048 \times 8$ -bit.
- Single or dual channel LVDS digital video.
- Progressive scan.
- Matrox Genesis receiving external trigger signal.
- Matrox Genesis sending EXPOSURE1 (EXPOSE) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC (LINE ENABLE), VSYNC (FRAME ENABLE), PIXEL CLOCK (PIX DATA @ 20 MHz) and video signals from camera.

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

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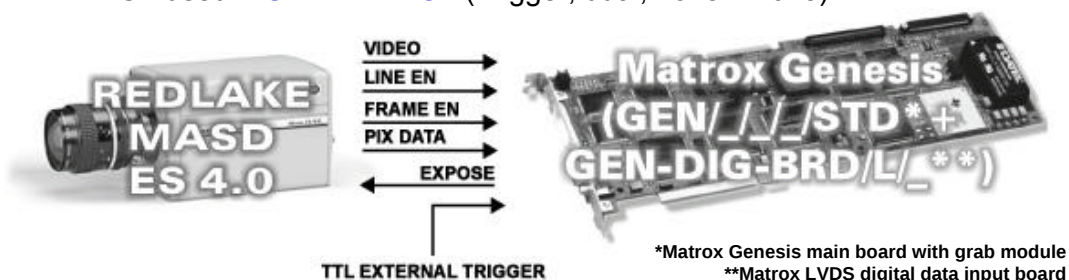
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Basics about the
interface modes

Camera Interface Briefs (Continued)

Mode 2: Asynchronous Reset (Trigger, Control)

- DCF used: [ES4CT11T.DCF](#) (Control, single, 1024 × 1024)
- DCF used: [ES4CT12T.DCF](#) (Control, dual, 1024 × 1024)
- DCF used: [ES4CT21T.DCF](#) (Control, single, 2048 × 2048)
- DCF used: [ES4CT22T.DCF](#) (Control, dual, 2048 × 2048)
- DCF used: [ES4T1K1T.DCF](#) (Trigger, single, 1024 × 1024)
- DCF used: [ES4T1K2T.DCF](#) (Trigger, dual, 1024 × 1024)
- DCF used: [ES4T2K1T.DCF](#) (Trigger, single, 2048 × 2048)
- DCF used: [ES4T2K2T.DCF](#) (Trigger, dual, 2048 × 2048)



Specifics about
the interface modes

Camera Interface Details

Mode 1: Continuous/Pseudo-continuous

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at up to 30 frames per second.
- **Exposure time:** Exposure time is controlled by the Remote Panel software. Refer to the camera manual for more information.
- **Remote Panel software settings:** Settings for this mode are as follows:

ES4C1K1T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	OF	1	31.998	15/8*	CS	1	N	5	12	P	AIA	2

ES4C1K2T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	OF	1	31.998	30/15/8*	CS	2	N	5	12	P	AIA	2

ES4C2K1T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	OF	1	31.998	8/4*	CS	1	N	5	12	P	AIA	1

ES4C2K2T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	OF	1	31.998	15/8/4*	CS	2	N	5	12	P	AIA	1

*Can be set to one of the listed values, refer to manual for details

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Specifics about
the interface modes

Camera Interface Details (Continued)

Mode 2: Asynchronous Reset (Trigger)

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** Exposure time is controlled by the Remote Panel software. Refer to the camera manual for more information.
- **Remote Panel software settings:** Settings for this mode are as follows:

ES4CT11T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	N/A	8*	CD	2	N	5	12	N	AIA	2

ES4CT12T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	N/A	8*	CD	1	N	5	12	N	AIA	2

ES4CT21T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	N/A	8*	CD	2	N	5	12	N	AIA	1

ES4CT22T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	N/A	15*	CD	1	N	5	12	N	AIA	1

*Default

Mode 2: Asynchronous Reset (Control)

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The active portion of the EXPOSURE1 (EXPOSE) signal is the exposure time. The default exposure time for this DCF is **32.2 μ s**. In order to select the exposure time, the width and deployment time of EXPOSURE1 (EXPOSE) must be set in Matrox Intellicam. The exposure time of the camera can be modified in the DCF using Matrox Intellicam, Genesis Native Library function **imCamControl()** or with the MIL digitizer control function **MdigControl()**. Refer to the appropriate manual or user guide for additional information.

Remote Panel software settings: Settings for this mode are as follows:

ES4T1K1T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	31.998	8*	TR	1	N	5	12	N	AIA	2

ES4T1K2T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	31.998	8*	TR	2	N	5	12	N	AIA	2

ES4T2K1T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	31.998	8*	TR	1	N	5	12	N	AIA	1

ES4T2K2T.DCF

BDE	DEF	DGN	EXE	FRS	MDE	RDM	STP	TPD	TPW	TRM	TRS	BNS
0	ON	1	31.998	15*	TR	2	N	5	12	N	AIA	1

* Controlled by external trigger frequency

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Cabling details for this
interface mode

Cabling Requirements

Mode 1: Continuous/Pseudo-continuous

- **Cable:** DBHD100-TO-OPEN (open ended) cable required for video, synchronization and control signals.
- **Connection:** Connections between the 68-pin connector of the camera and the 100-pin connectors of the Matrox Genesis are as follows:

GEN-DIG-BRD/LI_ (100-pin connector)		REDLAKE MASD ES 4.0 (68-pin connector)	
Pin name	Pin no.	Pin name	Pin no.
DATA, INPUT, 7+	15	←	BMSB + 10
DATA, INPUT, 7-	16	←	BMSB - 44
DATA, INPUT, 6+	13	←	BMSB1 + 11
DATA, INPUT, 6-	14	←	BMSB1 - 45
DATA, INPUT, 5+	11	←	BMSB2 + 13
DATA, INPUT, 5-	12	←	BMSB2 - 47
DATA, INPUT, 4+	09	←	BMSB3 + 14
DATA, INPUT, 4-	10	←	BMSB3 - 48
DATA, INPUT, 3+	07	←	BMSB4 + 15
DATA, INPUT, 3-	08	←	BMSB4 - 49
DATA, INPUT, 2+	05	←	BMSB5 + 16
DATA, INPUT, 2-	06	←	BMSB5 - 50
DATA, INPUT, 1+	03	←	BMSB6 + 19
DATA, INPUT, 1-	04	←	BMSB6 - 53
DATA, INPUT, 0+	01	←	BMSB7 + 20
DATA, INPUT, 0-	02	←	BMSB7 - 54
CLOCK, INPUT, +	39	←	PIX DATA STRB + 29
CLOCK, INPUT, -	40	←	PIX DATA STRB - 63
HSYNC, INPUT, +	33	←	LINE ENA + 26
HSYNC, INPUT, -	34	←	LINE ENA - 60
VSYNC, INPUT, +	35	←	FRAME ENA + 25
VSYNC, INPUT, -	36	←	FRAME ENA - 59
EXPOSURE1, OUTPUT, +	95*	→	EXPOSE + 30*
EXPOSURE1, OUTPUT, -	96*	→	EXPOSE - 64*
GROUND	50	--	GROUND 01
DATA, INPUT, 15+	31	←	AMSB + 02
DATA, INPUT, 15-	32	←	AMSB - 36
DATA, INPUT, 14+	29	←	AMSB1 + 03
DATA, INPUT, 14-	30	←	AMSB1 - 37
DATA, INPUT, 13+	27	←	AMSB2 + 04
DATA, INPUT, 13-	28	←	AMSB2 - 38
DATA, INPUT, 12+	25	←	AMSB3 + 05
DATA, INPUT, 12-	26	←	AMSB3 - 39
DATA, INPUT, 11+	23	←	AMSB 4+ 06
DATA, INPUT, 11-	24	←	AMSB 4- 40

* Connection not necessary for this mode however allows this cable to be used for both modes.

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*Cabling details for this
interface mode*

Cabling Requirements (Continued)

Mode 1: Continuous/Pseudo-continuous (8-bit)

GEN-DIG-BRD/LI_ (100-pin connector)		REDLAKE MASD ES 4.0 (68-pin connector)	
Pin name	Pin no.	Pin name	Pin no.
DATA, INPUT, 10+	21	←	AMSB 5+
DATA, INPUT, 10-	22	←	AMSB 5-
DATA, INPUT, 9+	19	←	AMSB 6+
DATA, INPUT, 9-	20	←	AMSB 6-
DATA, INPUT, 8+	17	←	AMSB 7+
DATA, INPUT, 8-	18	←	AMSB 7-

Mode 2: Asynchronous Reset (Trigger, Control)

- **Cable:** IMG-7W2-TO-5BNC and DBHD100-TO-OPEN (open ended) cables required for video, synchronization and control signals.
- **External Trigger:** TTL external trigger source should be connected to the TTL trigger input of IMG-7W2-TO-5BNC cable.
- **Connection:** All other connections are as in Mode 1: *Continuous/Pseudo-continuous*.

The DCF(s) mentioned in this application note can be found on the MIL, Native Library CD or our FTP site ([ftp.matrox.com](ftp:ftp.matrox.com)). The information furnished by Matrox Electronic Systems, 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.

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