

MATROX GENESIS

CAMERA INTERFACE APPLICATION NOTE

REDLAKE MASD (KODAK) ES1.0

AUGUST 8, 2001

Basics about the
camera

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

Basics about the
interface modes

Camera Descriptions

- $1008 \times 1018 \times 8/10$ -bit @ 15/30 fps.
- Single or dual channel RS-422 digital video output.
- Progressive scan.
- Internal or external sync.
- Internal or external exposure control.
- 20 MHz pixel clock rate.

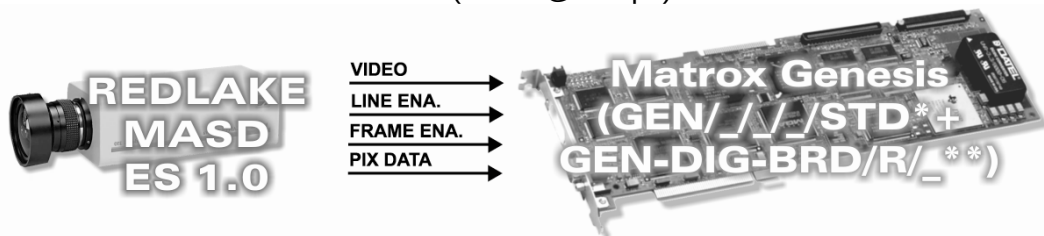
Interface Modes

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

Camera Interface Briefs

Mode 1: Continuous/Pseudo-continuous

- $1008 \times 1018 \times 8/10$ -bit @ 15/30 fps.
- Single or dual channel RS-422 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: [KES8D.DCF](#) (8-bit @ 15 fps)
- DCF used: [ES103D.DCF](#) (8-bit @ 30 fps)
- DCF used: [KES10D.DCF](#) (10-bit @ 15 fps)
- DCF used: [KES103D.DCF](#) (10-bit @ 30 fps)



Mode 2: Asynchronous Reset (Trigger, Control)

- $1008 \times 1018 \times 8/10$ -bit.
- Single or dual channel RS-422 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.

Continued...

*Matrox Genesis main board with grab module
**Matrox RS-422 digital data input board

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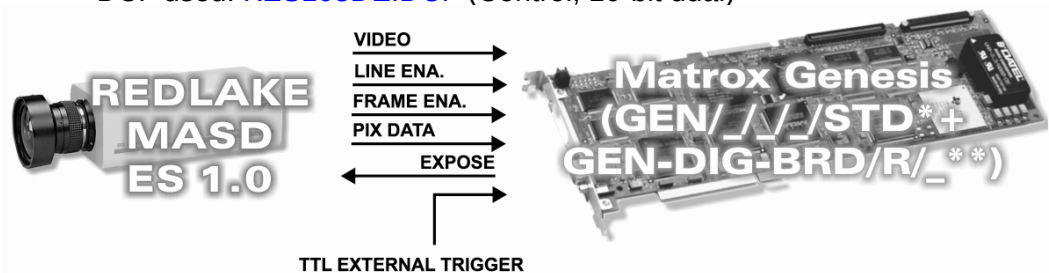
AUGUST 8, 2001

Basics about the
interface modes

Camera Interface Briefs (Cont.)

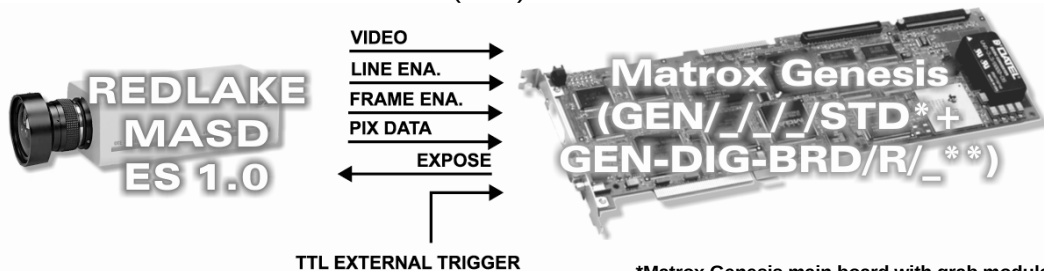
Mode 2: Asynchronous Reset (Trigger, Control)

- DCF used: [KES8DA.DCF](#) (Trigger, 8-bit, single)
- DCF used: [ES103DA.DCF](#) (Trigger, 8-bit, dual)
- DCF used: [KES10DA.DCF](#) (Trigger, 10-bit, single)
- DCF used: [KES103DA.DCF](#) (Trigger, 10-bit, dual)
- DCF used: [KES8DAE.DCF](#) (Control, 8-bit, single)
- DCF used: [ES103DAE.DCF](#) (Control, 8-bit, dual)
- DCF used: [KES10DAE.DCF](#) (Control, 10-bit, single)
- DCF used: [KES103DE.DCF](#) (Control, 10-bit dual)



Mode 3: Asynchronous Reset (Double Exposure Trigger)

- 1008 × 1018 × 8-bit.
- Single or dual channel RS-422 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.
- DCF used: [ES10DB.DCF](#) (single)
- DCF used: [ES103DB.DCF](#) (dual)



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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 30/60 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:

8-bit and 10-bit

DEF	GAB	BKB	BKE	MDE	EXE	STP	TRM	TRS	TRE	RDM	TPD	TPW	DGN
on	-22	0	0	CS	15.096	P	P	AIA	1	*	255	5	2

* Single channel = 1, dual channel = 2

Mode 2: Asynchronous Reset (Trigger, Control)

- **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:

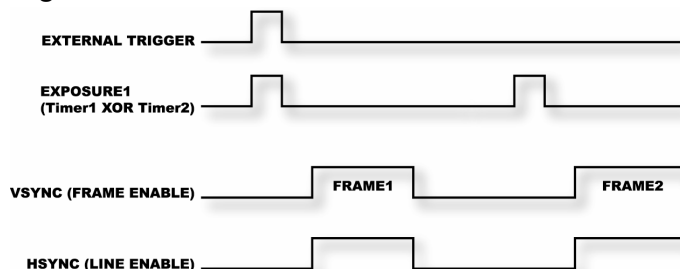
8-bit and 10-bit

DEF	GAB	BKB	BKE	MDE	EXE	STP	TRM	TRS	TRE	RDM	TPD	TPW	DGN
on	-22	0	0	*	15.096	P	P	AIA	1	**	255	5	2

* Trigger mode = TR, Control mode = CD **Single channel = 1, dual channel = 2

Mode 3: Asynchronous Reset (Double Exposure Trigger)

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal. Two frames are captured in rapid succession in this mode. The camera generates two frames, separated by the TPD (transfer pulse delay), which can be set in the Remote Panel software.
- **Exposure time:** A double pulse EXPOSURE1 signal (Timer1 XOR Timer2) is sent to the camera. The period between the two rising edges is the exposure period. 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:**



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

8-bit

DEF	GAB	BKB	BKE	MDE	EXE	STP	TRM	TRS	TRE	RDM	TPD	TPW	DGN
on	-22	0	0	DE	15.096	P	P	AIA	1	*	255	5	2

* Single channel = 1, dual channel = 2

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Cabling details for this
interface mode

Cabling Requirements

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

- **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/R/_ (100-pin connector)		REDLAKE MASD ES 1.0 (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.

Continued...

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Cabling details for this
interface mode

Cabling Requirements (Continued)

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

GEN-DIG-BRD/R/_ (100-pin connector)		REDLAKE MASD ES 1.0 (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 1: Continuous/Pseudo-continuous (10-bit)

- **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/R/_ (100-pin connector)		REDLAKE MASD ES 1.0 (68-pin connector)	
Pin name	Pin no.	Pin name	Pin no.
DATA, INPUT, 9+	19	←	BMSB+
DATA, INPUT, 9-	20	←	BMSB-
DATA, INPUT, 8+	17	←	BMSB1+
DATA, INPUT, 8-	18	←	BMSB1-
DATA, INPUT, 7+	15	←	BMSB2+
DATA, INPUT, 7-	16	←	BMSB2-
DATA, INPUT, 6+	13	←	BMSB3+
DATA, INPUT, 6-	14	←	BMSB3-
DATA, INPUT, 5+	11	←	BMSB4+
DATA, INPUT, 5-	12	←	BMSB4-
DATA, INPUT, 4+	09	←	BMSB5+
DATA, INPUT, 4-	10	←	BMSB5-
DATA, INPUT, 3+	07	←	BMSB6+
DATA, INPUT, 3-	08	←	BMSB6-
DATA, INPUT, 2+	05	←	BMSB7+
DATA, INPUT, 2-	06	←	BMSB7-
DATA, INPUT, 1+	03	←	BMSB8+
DATA, INPUT, 1-	04	←	BMSB8-
DATA, INPUT, 0+	01	←	BMSB9+
DATA, INPUT, 0-	02	←	BMSB9-
CLOCK, INPUT, +	39	←	PIX DATA STRB +
CLOCK, INPUT, -	40	←	PIX DATA STRB -

Continued...

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*Cabling details for this
interface mode*

Cabling Requirements (Continued)

Mode 1: Continuous/Pseudo-continuous (10-bit)

GEN-DIG-BRD/R/_ (100-pin connector)		REDLAKE MASD ES 1.0 (68-pin connector)	
<i>Pin name</i>	<i>Pin no.</i>	<i>Pin name</i>	<i>Pin no.</i>
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, 25+	69	←	AMSB+ 02
DATA, INPUT, 25-	70	←	AMSB- 36
DATA, INPUT, 24+	67	←	AMSB-1+ 03
DATA, INPUT, 24-	68	←	AMSB-1- 37
DATA, INPUT, 23+	65	←	AMSB-2+ 04
DATA, INPUT, 23-	66	←	AMSB-2- 38
DATA, INPUT, 22+	63	←	AMSB-3+ 05
DATA, INPUT, 22-	64	←	AMSB-3- 39
DATA, INPUT, 21+	61	←	AMSB-4+ 06
DATA, INPUT, 21-	62	←	AMSB-4- 40
DATA, INPUT, 20+	59	←	AMSB-5+ 07
DATA, INPUT, 20-	60	←	AMSB-5- 41
DATA, INPUT, 19+	57	←	AMSB-6+ 08
DATA, INPUT, 19-	58	←	AMSB-6- 42
DATA, INPUT, 18+	55	←	AMSB-7+ 09
DATA, INPUT, 18-	56	←	AMSB-7- 43
DATA, INPUT, 17+	53	←	AMSB-8+ 21
DATA, INPUT, 17-	54	←	AMSB-8- 55
DATA, INPUT, 16+	51	←	AMSB-9+ 31
DATA, INPUT, 16-	52	←	AMSB-9- 65

* 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 2 and 3: Asynchronous Reset (Trigger, Control, Double)

- **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 (8-bit or 10-bit respectively).

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 Electronic 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.

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