MATROX GENESIS
CAMERA INTERFACE APPLICATION NOTE
DALSTAR 1M60 OCTOBER 19, 2001

Basics about the camera

Camera Descriptions

- 1024 × 1024 × 12-bit @ 60 fps.
- Four channel RS-422 digital video output.
- Progressive scan.
- Internal (separate) sync.
- Internal and external exposure control.
- 20 MHz pixel clock rate.

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

Interface Modes

- Continuous (no binning, binning)
- Asynchronous reset (no binning, binning)

Basics about the interface modes

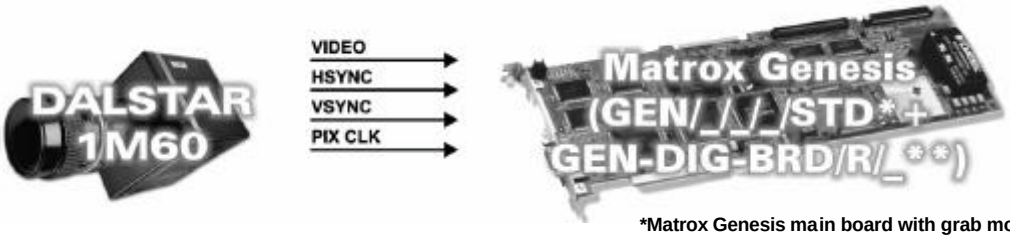
Camera Interface Briefs

Mode 1: Continuous (no binning)

- 1024 × 1024 × 12-bit @ 60 fps.
- Four channel RS-422 digital video.
- Progressive scan.
- Matrox Genesis receiving HSYNC, VSYNC, PIXEL CLOCK (@ 20 MHz) and video signals from camera.
- DCF: G1M60C1.DCF

Mode 2: Continuous (Binning)

- Up to 512 × 512 × 12-bit @ 120 fps.
- Four channel RS-422 digital video.
- Progressive scan.
- Matrox Genesis receiving HSYNC, VSYNC, PIXEL CLOCK (@ 10 MHz) and video signals from camera.
- DCF used: G1M60C2.DCF



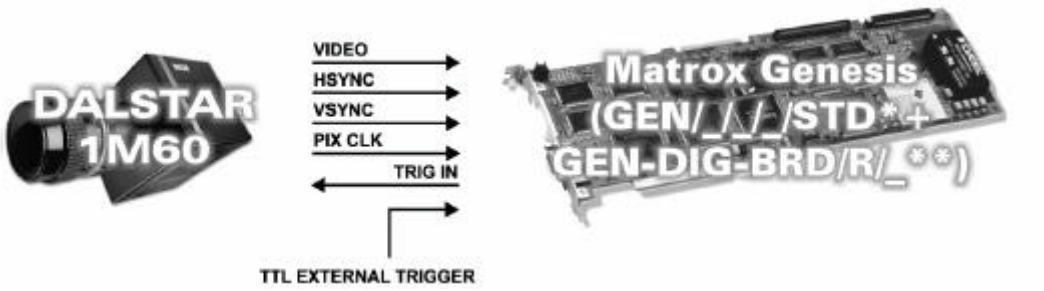
***Matrox Genesis main board with grab module**
****Matrox RS-422 digital input board**

Basics about the interface modes

Camera Interface Briefs (continued)

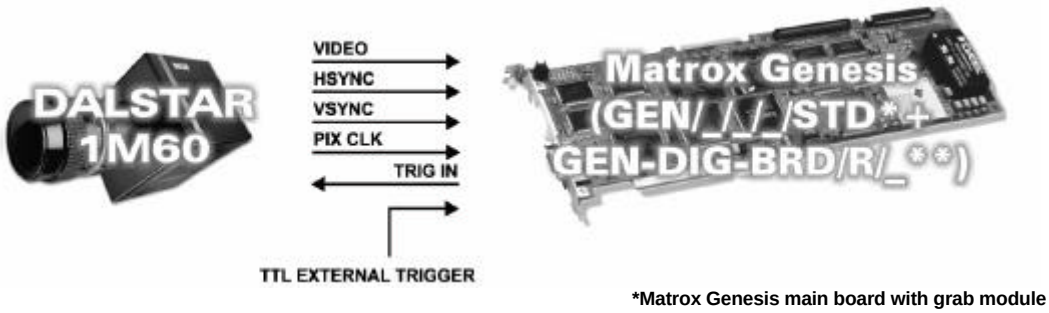
Mode 3: Asynchronous reset (no binning)

- 1024 × 1024 × 12-bit.
- Single channel RS-422 digital video.
- Progressive scan.
- Matrox Genesis receiving TTL external trigger signal.
- Matrox Genesis sending EXPOSURE2 (TRIGGER IN) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC, VSYNC, PIXEL CLOCK (@ 20 MHz) and video signals from camera.
- DCF used: G1M60A1.DCF



Mode 4: Asynchronous reset (binning)

- 512 × 512 × 12-bit.
- Single channel RS-422 digital video.
- Progressive scan.
- Matrox Genesis receiving TTL external trigger signal.
- Matrox Genesis sending EXPOSURE2 (TRIGGER IN) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC, VSYNC, PIXEL CLOCK (@ 10 MHz) and video signals from camera.
- DCF used: G1M60A2.DCF



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

Specifics about the interface modes

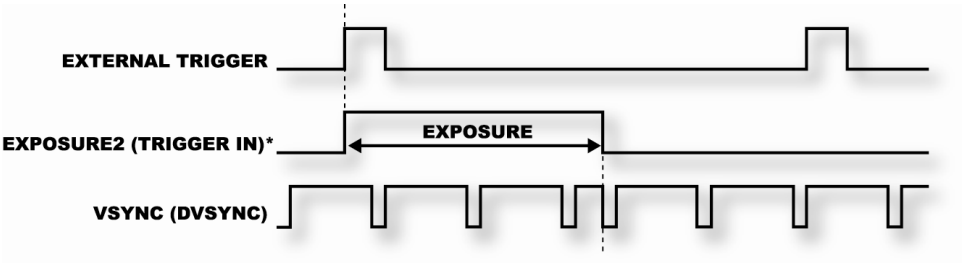
Camera Interface Details

Modes 1 and 2: Continuous

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at 60/120 frames per second (no binning/binning).
- **Exposure time:** Exposure time is inversely proportionate to the frame rate or determined by the shutter setting. Refer to the camera manual for more information.
- **Camera Control:** Camera control settings are made using DALSA's control software. Contact DALSA for more information.

Modes 3 and 4: Asynchronous Reset

- **Frame rate**: The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** External trigger source activates EXPOSURE2 (TRIGGER IN) signal. The width (rising edge to falling edge) of the EXPOSURE2 (TRIGGER IN)* signal is the exposure time. The default exposure time is equal to **30 ms** (no binning) or **11 ms** (binning). The exposure time can be modified in the DCF using Matrox Intellicam, Genesis Native Library (GNL) imCamControl() or with the MIL MdigControl() function. Refer to the respective manual for more information.
- **Camera Control:** External Trigger Mode/Integrate checkbox must be checked in DALSA's control software. Refer to the camera manual for more information.
- **Timing diagram:**



*SMA Connector

Cabling details for this interface mode

Cabling Requirements

Modes 1 and 2: Continuous

- **Cable:** DBHD100-TO-OPEN (open ended) cable required for video, synchronization and control signals.
- **Connection:** Connections between the 60-pin quad row connectors (**DATA1/DATA2**) of the camera and the 100-pin connector of the Matrox Genesis are as follows:

DALSA 1M60 (60-pin connector- DATA 1)			**Matrox Genesis (100-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
D1A4+	9	→	DATA, INPUT, 0+	1
D1A4-	10	→	DATA, INPUT, 0-	2
D1A5+	11	→	DATA, INPUT, 1+	3
D1A5-	12	→	DATA, INPUT, 1-	4
D1A6+	13	→	DATA, INPUT, 2+	5
D1A6-	14	→	DATA, INPUT, 2-	6
D1A7+	17	→	DATA, INPUT, 3+	7
D1A7-	18	→	DATA, INPUT, 3-	8
D1A8+	19	→	DATA, INPUT, 4+	9
D1A8-	20	→	DATA, INPUT, 4-	10
D1A9+	21	→	DATA, INPUT, 5+	11
D1A9-	22	→	DATA, INPUT, 5-	12
D1A10+	23	→	DATA, INPUT, 6+	13
D1A10-	24	→	DATA, INPUT, 6-	14
D1A11+	25	→	DATA, INPUT, 7+	15
D1A11-	26	→	DATA, INPUT, 7-	16
D1B4+	40	→	DATA, INPUT, 8+	17
D1B4-	39	→	DATA, INPUT, 8-	18
D1B5+	38	→	DATA, INPUT, 9+	19
D1B5-	37	→	DATA, INPUT, 9-	20
D1B6+	36	→	DATA, INPUT, 10+	21
D1B6-	35	→	DATA, INPUT, 10-	22
D1B7+	34	→	DATA, INPUT, 11+	23
D1B7-	33	→	DATA, INPUT, 11-	24
D1B8+	32	→	DATA, INPUT, 12+	25
D1B8-	31	→	DATA, INPUT, 12-	26
D1B9+	52	→	DATA, INPUT, 13+	27
D1B9-	51	→	DATA, INPUT, 13-	28
D1B10+	50	→	DATA, INPUT, 14+	29
D1B10-	49	→	DATA, INPUT, 14-	30
D1B11+	48	→	DATA, INPUT, 15+	31
D1B11-	47	→	DATA, INPUT, 15-	32

Continued…

Cabling details for this interface mode

Cabling Requirements (continued)

Modes 1 and 2: Continuous

DALSA 1M60 (60-pin connector- DATA 1)			**Matrox Genesis (100-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
D1HSYNC+	58	→	HSYNC, INPUT, +	33
D1HSYNC -	57	→	HSYNC, INPUT, -	34
D1VSYNC+	56	→	VSYNC, INPUT, +	35
D1VSYNC -	55	→	VSYNC, INPUT, -	36
GND	45	→	GROUND	37
GND	46	→	GROUND	38
D1PCLK+	60	→	CLOCK, INPUT, +	39
D1PCLK -	59	→	CLOCK, INPUT, -	40
DALSA 1M60 (60-pin connector- DATA 2)			**Matrox Genesis (100-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
D2A4+	9	→	DATA, INPUT, 16+	51
D2A4-	10	→	DATA, INPUT, 16-	52
D2A5+	11	→	DATA, INPUT, 17+	53
D2A5-	12	→	DATA, INPUT, 17-	54
D2A6+	13	→	DATA, INPUT, 18+	55
D2A6-	14	→	DATA, INPUT, 18-	56
D2A7+	17	→	DATA, INPUT, 19+	57
D2A7-	18	→	DATA, INPUT, 19-	58
D2A8+	19	→	DATA, INPUT, 20+	59
D2A8-	20	→	DATA, INPUT, 20-	60
D2A9+	21	→	DATA, INPUT, 21+	61
D2A9-	22	→	DATA, INPUT, 21-	62
D2A10+	23	→	DATA, INPUT, 22+	63
D2A10-	24	→	DATA, INPUT, 22-	64
D2A11+	25	→	DATA, INPUT, 23+	65
D2A11-	26	→	DATA, INPUT, 23-	66
D2B4+	40	→	DATA, INPUT, 24+	67
D2B4-	39	→	DATA, INPUT, 24-	68
D2B5+	38	→	DATA, INPUT, 25+	69
D2B5-	37	→	DATA, INPUT, 25-	70
D2B6+	36	→	DATA, INPUT, 26+	71
D2B6-	35	→	DATA, INPUT, 26-	72
D2B7+	34	→	DATA, INPUT, 27+	73
D2B7-	33	→	DATA, INPUT, 27-	74
D2B8+	32	→	DATA, INPUT, 28+	75
D2B8-	31	→	DATA, INPUT, 29-	76

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Cabling details for this interface mode

Cabling Requirements (continued)

Modes 1 and 2: Continuous

DALSA 1M60 (60-pin connector- DATA 2)			Matrox Genesis (100-pin connector)	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
D2B9+	52	→	DATA, INPUT, 29+	77
D2B9-	51	→	DATA, INPUT, 30-	78
D2B10+	50	→	DATA, INPUT, 31+	79
D2B10-	49	→	DATA, INPUT, 31-	80
D2B11+	48	→	DATA, INPUT, 32+	81
D2B11-	47	→	DATA, INPUT, 32-	82

- **Connection:** Connections between the SMA/BNC connector of the camera and the 100-pin connector of the Matrox Genesis are as follows:

DALSA 1M60 (SMA/BNC connector)			Matrox Genesis (100-pin connector)	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
SMA or BNC*	--	←	EXPOSURE2, OUTPUT, TTL	88*
GND*	--	--	GROUND	38*

* This connection is not necessary for this mode, however allows the cable to be used for all modes.

Modes 3 and 4: Asynchronous Reset

- **Cable:** DBHD100-TO-OPEN (open ended) and IMG-7W2-TO-5BNC cables required for video, synchronization and control signals.
- **External Trigger:** TTL external trigger source should be connected to the TTL trigger input (Gray BNC) of the IMG-7W2-TO-5BNC cable.
- **Connection:** Connections between the two 60-pin quad row connectors (**DATA1**) of the camera and the 100-pin connector of the Matrox Genesis are as in Mode 1*: Continuous* along with the following:

DALSA 1M60 (SMA/BNC connector)			Matrox Genesis (100-pin connector)	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
SMA or BNC	--	←	EXPOSURE2, OUTPUT, TTL	88
GND	--	--	GROUND	38

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). 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.

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