MATROX GENESIS
CAMERA INTERFACE APPLICATION NOTE
DALSTAR 4M25 DECEMBER 17, 2001

Basics about the camera

Camera Descriptions

- Effective resolution: 2052 × 2048 × 8-bit @ up to 25 fps[i].
- Four tap (output) LVDS digital video output[ii].
- Progressive scan.
- Internal sync.
- Internal or external exposure control (integration).
- 40 MHz pixel clock rate.

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

Interface Modes

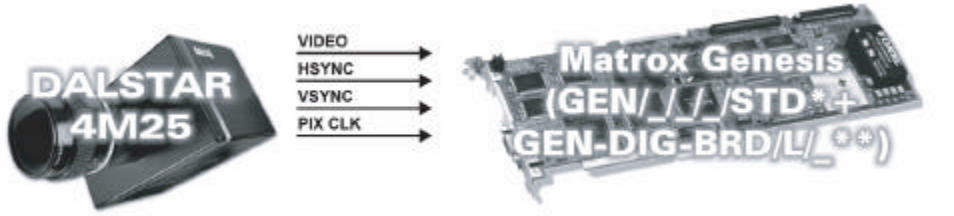
- Continuous
- Asynchronous reset (Pulse width control, external integration)

Basics about the interface modes

Camera Interface Briefs

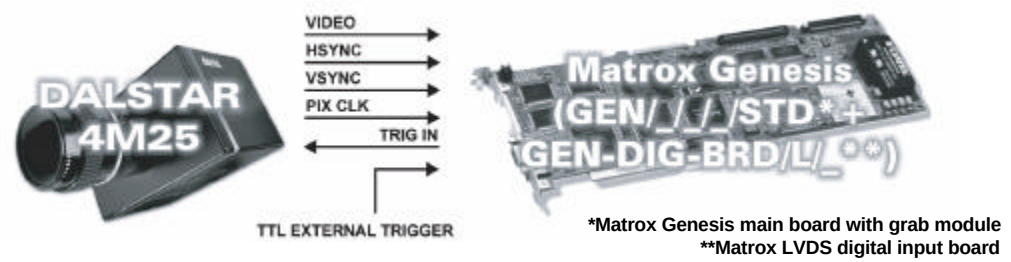
Mode 1: Continuous

- 2052 × 2048 × 8-bit @ 25 fps[iii].
- Four tap (output) LVDS digital video output.
- Progressive scan.
- Matrox Genesis receiving HSYNC, VSYNC, PIXEL CLOCK (PIXCLK @ 40 MHz) and video signals from camera.
- DCF used: G4M25DC.DCF



Mode 2: Asynchronous reset (Pulse width control, ext. int.)

- 2052 × 2048 × 8-bit @ 25 fps.
- Four tap (output) LVDS digital video output.
- Progressive scan.
- Matrox Genesis receiving external trigger signal.
- Matrox Genesis sending EXPOSURE1 (TRIGGER IN) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC, VSYNC, PIXEL CLOCK (PIXCLK @ 40 MHz) and video signals from camera.
- DCF used: G4M25DA.DCF



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

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Specifics about the interface modes

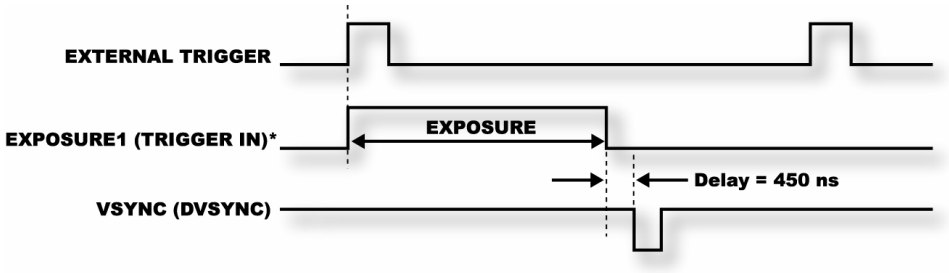
Camera Interface Details

Modes 1: Continuous

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at 25 frames per second.
- **Exposure time:** Exposure time is inversely proportionate to the frame rate (no shutter) or determined by the shutter setting. Refer to the camera manual for more information.
- **Camera control:** Users can control the camera via the RJ-11 serial port using RS-232 compatible signals. Refer to the camera manual for additional information.

Modes 2: Asynchronous reset (Pulse width control, ext. int.)

- **Frame rate**: The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The external trigger source activates the EXPOSURE1 (TRIGGER IN) signal. The width (rising edge to falling edge) of the EXPOSURE1 (TRIGGER IN)* signal is the exposure time. The default exposure time for this DCF equals **3.5 ms**. 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.
- **Minimum exposure width:** As per DALSA, the minimum EXPOSURE1 (TRIGGER) pulse width is **10 ms**.
- **Camera control:** Users can control the camera via the RJ-11 serial port using RS-232 compatible signals. Refer to the camera manual for additional information.
- **Timing diagram:**



*SMA connector (TRIGGER IN)

Cabling details for this interface mode

Cabling Requirements

Modes 1: 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:

Matrox Genesis (100-pin connector)			**DALSTAR 4M25 (60-pin connector-DATA 1)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 0+	01	←	D1A4+	09
DATA, INPUT, 0-	02	←	D1A4-	10
DATA, INPUT, 1+	03	←	D1A5+	11
DATA, INPUT, 1-	04	←	D1A5-	12
DATA, INPUT, 2+	05	←	D1A6+	13
DATA, INPUT, 2-	06	←	D1A6-	14
DATA, INPUT, 3+	07	←	D1A7+	17
DATA, INPUT, 3-	08	←	D1A7-	18
DATA, INPUT, 4+	09	←	D1A8+	19
DATA, INPUT, 4-	10	←	D1A8-	20
DATA, INPUT, 5+	11	←	D1A9+	21
DATA, INPUT, 5-	12	←	D1A9-	22
DATA, INPUT, 6+	13	←	D1A10+	23
DATA, INPUT, 6-	14	←	D1A10-	24
DATA, INPUT, 7+	15	←	D1A11+	25
DATA, INPUT, 7-	16	←	D1A11-	26
HSYNC, INPUT, +	33	←	HSYNC+	58
HSYNC, INPUT, -	34	←	HSYNC -	57
VSYNC, INPUT, +	35	←	VSYNC+	56
VSYNC, INPUT, -	36	←	VSYNC -	55
GROUND	37	←	GND	45
GROUND	38	←	GND	46
CLOCK, INPUT, +	39*	←	PIXCLK-	59*
CLOCK, INPUT, -	40*	←	PIXCLK +	60*

*IMPORTANT: This camera uses the falling edge of the pixel clock to register data.

Matrox Genesis (100-pin connector)			**DALSTAR 4M25 (60-pin connector-DATA 2)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 8+	17	←	D1B4+	09
DATA, INPUT, 8-	18	←	D1B4-	10
DATA, INPUT, 9+	19	←	D1B5+	11
DATA, INPUT, 9-	20	←	D1B5-	12

Continued…

Cabling details for this interface mode

Cabling Requirements (continued)

Modes 1: Continuous

- **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:

Matrox Genesis (100-pin connector)			**DALSTAR 4M25 (60-pin connector-DATA 2)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 10+	21	←	D1B6+	13
DATA, INPUT, 10-	22	←	D1B6-	14
DATA, INPUT, 11+	23	←	D1B7+	17
DATA, INPUT, 11-	24	←	D1B7-	18
DATA, INPUT, 12+	25	←	D1B8+	19
DATA, INPUT, 12-	26	←	D1B8-	20
DATA, INPUT, 13+	27	←	D1B9+	21
DATA, INPUT, 13-	28	←	D1B9-	22
DATA, INPUT, 14+	29	←	D1B10+	23
DATA, INPUT, 14-	30	←	D1D10-	24
DATA, INPUT, 15+	31	←	D1B11+	25
DATA, INPUT, 15-	32	←	D1B11-	26

- **Connection:** Connections between the 60-pin quad row connectors (**DATA3/DATA4**) of the camera and the 100-pin connector of the Matrox Genesis are as follows:

Matrox Genesis (100-pin connector)			**DALSTAR 4M25 (60-pin connector-DATA 3)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 16+	51	←	D1C4+	09
DATA, INPUT, 16-	52	←	D1C4-	10
DATA, INPUT, 17+	53	←	D1C5+	11
DATA, INPUT, 17-	54	←	D1C5-	12
DATA, INPUT, 18+	55	←	D1C6+	13
DATA, INPUT, 18-	56	←	D1C6-	14
DATA, INPUT, 19+	57	←	D1C7+	17
DATA, INPUT, 19-	58	←	D1C7-	18
DATA, INPUT, 20+	59	←	D1C8+	19
DATA, INPUT, 20-	60	←	D1C8-	20
DATA, INPUT, 21+	61	←	D1C9+	21
DATA, INPUT, 21-	62	←	D1C9-	22
DATA, INPUT, 22+	63	←	D1C10+	23
DATA, INPUT, 22-	64	←	D1C10-	24
DATA, INPUT, 23+	65	←	D1C11+	25
DATA, INPUT, 23-	66	←	D1C11-	26

Continued…

Cabling details for this interface mode

Cabling Requirements (continued)

Modes 1: Continuous

- **Connection:** Connections between the 60-pin quad row connectors (**DATA3/DATA4**) of the camera and the 100-pin connector of the Matrox Genesis are as follows:

Matrox Genesis (100-pin connector)			**DALSTAR 4M25 (60-pin connector-DATA 4)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 24+	67	←	D1D4+	09
DATA, INPUT, 24-	68	←	D1D4-	10
DATA, INPUT, 25+	69	←	D1D5+	11
DATA, INPUT, 25-	70	←	D1D5-	12
DATA, INPUT, 26+	71	←	D1D6+	13
DATA, INPUT, 26-	72	←	D1D6-	14
DATA, INPUT, 27+	73	←	D1D7+	17
DATA, INPUT, 27-	74	←	D1D7-	18
DATA, INPUT, 28+	75	←	D1D8+	19
DATA, INPUT, 28-	76	←	D1D8-	20
DATA, INPUT, 29+	77	←	D1D9+	21
DATA, INPUT, 29-	78	←	D1D9-	22
DATA, INPUT, 30+	79	←	D1D10+	23
DATA, INPUT, 30-	80	←	D1D10-	24
DATA, INPUT, 31+	81	←	D1D11+	25
DATA, INPUT, 31-	82	←	D1D11-	26

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

Matrox Genesis (100-pin connector)		**DALSTAR 4M25 (SMA connector)**	
Pin name	***Pin no.***	***Pin name***	***Pin no.***
EXPOSURE1, OUTPUT, TTL	87**	SMA**	--
GROUND	38**	GND**	--

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

Modes 2: Asynchronous reset (Pulse width control, ext. int.)

- **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 (**DATA1-4**) of the camera and the 100-pin connector of the Matrox Genesis are as in Mode 1*: Continuous* along with the following:

Matrox Genesis (100-pin connector)		**DALSTAR 4M25 (SMA connector)**	
Pin name	***Pin no.***	***Pin name***	***Pin no.***
EXPOSURE1, OUTPUT, TTL	87*	SMA*	--
GROUND	38*	GND*	--

[i] The camera outputs 12-bits per tap, however only the 8 most significant bits from each of the four taps can be connected to the Matrox Genesis 32-bit digital connector.
[ii] Note that the scan direction is different (inverted) for each of the four taps. Refer to the camera manual for more information.
[iii] Acquisition rates will be lower than listed as a result of processing required to correct the inverted taps.

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 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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