MATROX GENESIS
CAMERA INTERFACE APPLICATION NOTE
PULNiX TM-1010 SEPTEMBER 27, 2001

Basics about the camera

Camera Descriptions

- 1008 × 1018 × 10-bit @ up to 15 fps.
- Single analog or RS-422 digital video output.
- Progressive scan.
- Internal or external exposure control.
- 20 MHz pixel clock rate.

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

Basics about the interface modes

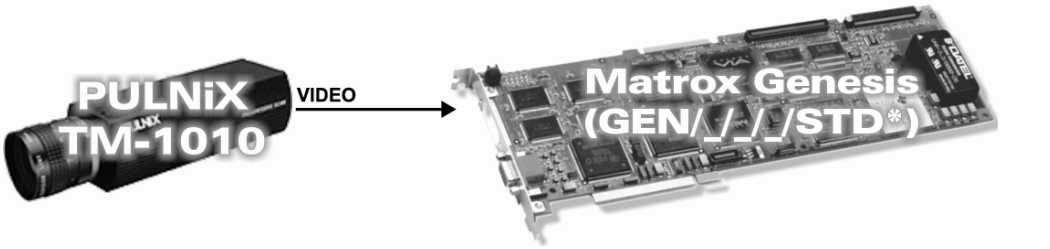
Interface Modes

- Continuous
- Asynchronous reset (Pulse Width Control mode)

Camera Interface Briefs

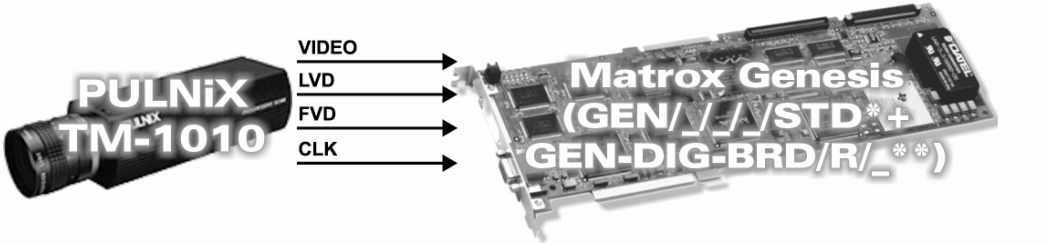
Mode 1: Continuous -analog

- 1001 × 1016 × 10-bit @ 15 fps.
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving video signals from camera.
- DCF used: TM1010N.DCF



Mode 2: Continuous – digital

- 1001 × 1016 × 10-bit @ 15 fps.
- Single channel RS-422 digital video.
- Progressive scan.
- Matrox Genesis receiving HSYNC (LDV), VSYNC (FDV), PIXEL CLOCK (CLK @ 20 MHz) and video signals from camera.
- DCF used: TM1010C.DCF



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

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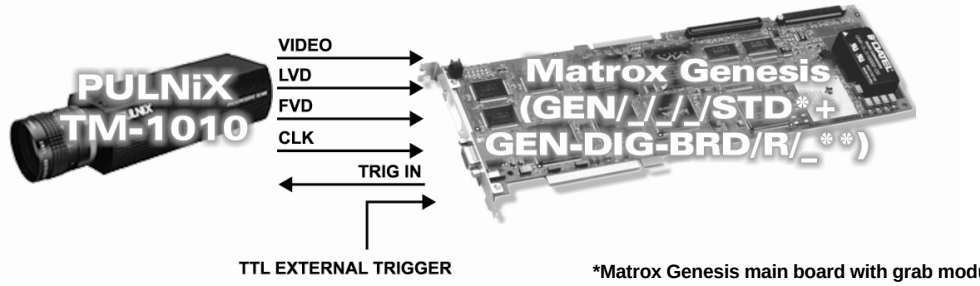
Basics about the interface modes

Camera Interface Briefs (continued)

Mode 3: Asynchronous Reset (Pulse Width Control mode)

- 1001 × 1016 × 10-bit.
- Single channel RS-422 digital video.
- Progressive scan.
- Matrox Genesis receiving TTL external trigger signal.
- Matrox Genesis sending EXPOSURE2 (VINIT) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC (LDV), VSYNC (FDV), PIXEL CLOCK (CLK @ 20 MHz) and video signals from camera.
- DCF used: TM1010A.DCF



***Matrox Genesis main board with grab module**
****Matrox digital cable adapter board**

Specifics about the interface modes

Camera Interface Details

Modes 1: Continuous

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at 15 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 switch settings:** Refer to the camera manual for additional information. Switches for this mode should be set as follows:

Switch	*Setting*
Shutter Control	As Desired
Mode Control	0
UP/DWN	UP

Mode 2: Asynchronous Reset (Pulse Width Control mode)

- **Frame rate**: The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The width (rising edge to falling edge) of the EXPOSURE2 (VINIT) signal is the exposure time. The default exposure time is equal to **20.34 ms**. The exposure time can be modified in the DCF using Matrox Intellicam, Genesis Native Library (GNL) imCamControl() or or with the MIL MdigControl() function. Consult the respective manual for more information.

Continued…

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Specifics about the interface modes

Camera Interface Details (continued)

Mode 2: Asynchronous Reset (Pulse Width Control mode)

- **Camera switch settings:** Refer to the camera manual for additional information. Switches for this mode should be set as follows:

Switch	*Setting*
Shutter Control	9
Mode Control	2
UP/DWN	DWN

Cabling details for the interface modes

Cabling Requirements

Mode 1: Continuous - analog

- **Cable:** IMG-7W2-TO-5BNC cable required for video signals.
- **Connection:** Video input BNC of IMG-7W2-TO-5BNC cable should be connected to VIDEO OUT BNC connector of camera.

Mode 2: Continuous - digital

- **Cable:** DBHD100-TO-OPEN cable required for video, synchronization and control signals.
- **Connection:** Connections between the 31-pin connector of the camera and the 100-pin connector of the Matrox Genesis are as follows:

GEN-DIG-BRD/R/_ (100-pin connector)			**PULNIX TM-1010 (31-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
CLOCK, INPUT, +	39	←	CLK+	01
CLOCK, INPUT, -	40	←	CLK-	17
HSYNC, INPUT, +	33	←	LVD+	02
HSYNC, INPUT, -	34	←	LVD-	18
VSYNC, INPUT, +	35	←	FVD+	03
VSYNC, INPUT, -	36	←	FVD-	19
GROUND	50	--	GND	04
GROUND	37	--	GND	16
DATA, INPUT, 0+	01	←	D0+	06
DATA, INPUT, 0-	02	←	D0-	22
DATA, INPUT, 1+	03	←	D1+	07
DATA, INPUT, 1-	04	←	D1-	23
DATA, INPUT, 2+	05	←	D2+	08
DATA, INPUT, 2-	06	←	D2-	24
DATA, INPUT, 3+	07	←	D3+	09
DATA, INPUT, 3-	08	←	D3-	25
DATA, INPUT, 4+	09	←	D4+	10
DATA, INPUT, 4-	10	←	D4-	26
DATA, INPUT, 5+	11	←	D5+	11
DATA, INPUT, 5-	12	←	D5-	27

Cabling continued….

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Cabling details for the interface modes

Cabling Requirements (Continued)

Mode 1: Continuous - digital

- **Connection:** Continued from previous page:

GEN-DIG-BRD/R/_ (44-pin connector)			**PULNIX TM-1010 (31-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 6+	13	←	D6+	12
DATA, INPUT, 6-	14	←	D6-	28
DATA, INPUT, 7+	15	←	D7+	13
DATA, INPUT, 7-	16	←	D7-	29
DATA, INPUT, 8+	17	←	D8+	14
DATA, INPUT, 8-	18	←	D8-	30
DATA, INPUT, 9+	19	←	D9+	15
DATA, INPUT, 9-	20	←	D9-	31
EXPOSURE2, OUTPUT, TTL	88*	→	VINIT	20*

* This connection is not required for this mode, however allows this cable to be used with both digital modes.

Mode 2: Asynchronous Reset (Pulse Width Control mode)

- **Cable:** DBHD100-TO-OPEN and IMG-7W2-TO-5BNC cables required for video, external trigger, 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 31-pin connector of the camera and the 100-pin connector of the Matrox Genesis are as in Mode 1 plus the following additional connection:

GEN-DIG-BRD/R/_ (100-pin connector)			**PULNIX TM-1010 (31-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
EXPOSURE2, OUTPUT, TTL	88	→	VINIT	20

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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