MATROX GENESIS
CAMERA INTERFACE APPLICATION NOTE
PULNiX TM-1020-15 MARCH 13, 2001

Basics about the camera

Camera Descriptions

- 1008 × 1018 × 8-bit @ 15 fps.
- Single channel analog/RS-422 digital video output.
- Progressive scan.
- Internal (composite) sync.
- Internal or external exposure control.
- 20 MHz pixel clock rate.

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

Interface Modes

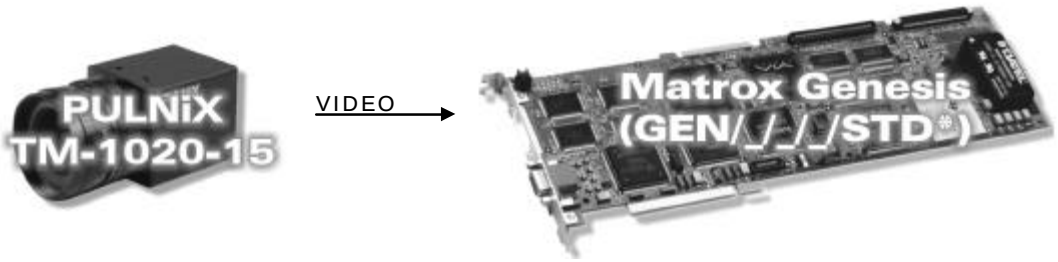
- Continuous
- Asynchronous reset (pulse width control mode)

Basics about the interface modes

Camera Interface Briefs

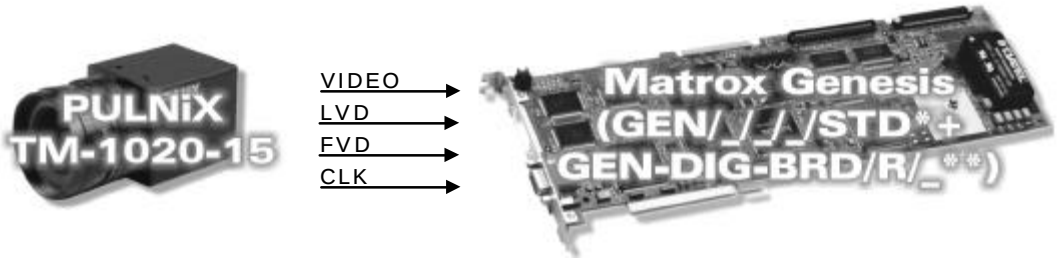
Mode 1: Continuous (analog)

- 1000 × 1016 × 8-bit @ 15 fps.
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving video signals from camera.
- DCF used: GTM1020C.DCF



Mode 2: Continuous (digital)

- 1006 × 1016 × 8-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: TM1020DC.DCF



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

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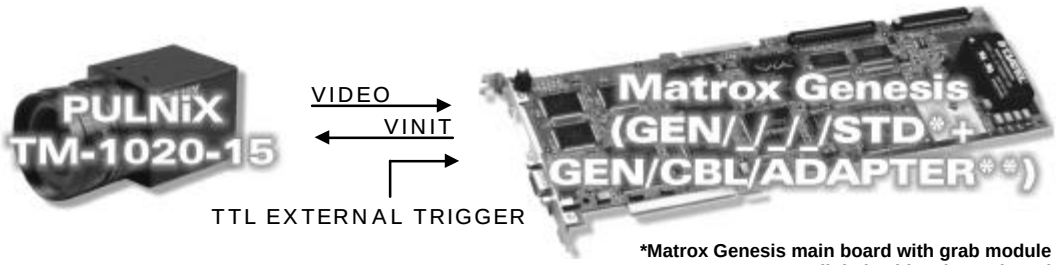
Basics about the interface modes

Camera Interface Briefs (continued)

Mode 3: Asynchronous Reset (analog)

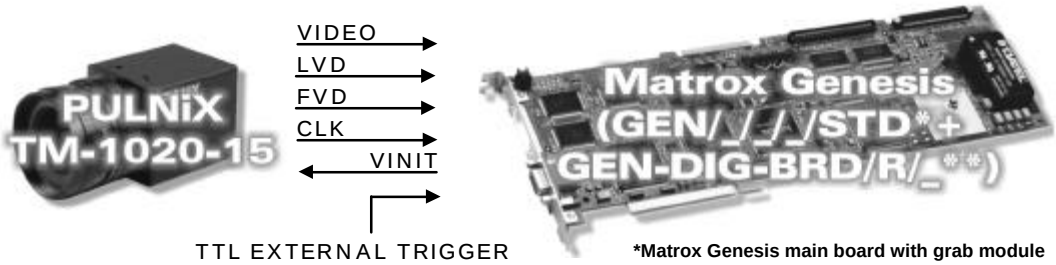
- 1000 × 1016 × 8-bit.
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving external trigger signal.
- Matrox Genesis sending EXPOSURE2 (VINIT) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving video signals from camera.
- DCF used: GTM1020A.DCF



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

Mode 4: Asynchronous Reset (digital)

- 1006 × 1016 × 8-bit.
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving 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: TM1020DA.DCF



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

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Specifics about the interface modes

Camera Interface Details

Modes 1 and 2: Continuous (analog, digital)

- **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:

Switches	*Settings*
Shutter Control	As desired
Mode Control	0
UP/DOWN	UP

Modes 3 and 4: Asynchronous Reset (analog, digital)

- **Frame rate**: The frame rate is determined by the frequency of the external trigger signal.
- **Maximum frame rate**: Maximum frame rate equals **66.6 ms** + **13 ms** () = **79.66 ms**. Since the frame rate is based on the external trigger signal frequency, to achieve a maximum frame rate the external trigger signal period must be equal to 80 ms.
- **Exposure time:** The low level (pulse period) of the EXPOSURE2 (VINIT) signal is the exposure time. The default exposure time is equal to **13 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:** minimum EXPOSURE2 (TRIGGER) pulse width is equal to **508** **ms**.
- **Camera switch settings:** Refer to the camera manual for additional information. Switches for this mode should be set as follows:

Switches	*Settings*
Shutter Control	9
Mode Control	8
UP/DOWN	DOWN

Cabling details for this interface mode

Cabling Requirements

Mode 1: Continuous (analog)

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

Cabling details for the interface modes

Cabling Requirements (Continued)

Mode 2: Continuous (digital)

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

GEN-DIG-BRD/R/_ (100-pin connector)			**PULNiX TM-1020-15 (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+	08
DATA, INPUT, 0-	02	←	D0-	24
DATA, INPUT, 1+	03	←	D1+	09
DATA, INPUT, 1-	04	←	D1-	25
DATA, INPUT, 2+	05	←	D2+	10
DATA, INPUT, 2-	06	←	D2-	26
DATA, INPUT, 3+	07	←	D3+	11
DATA, INPUT, 3-	08	←	D3-	27
DATA, INPUT, 4+	09	←	D4+	12
DATA, INPUT, 4-	10	←	D4-	28
DATA, INPUT, 5+	11	←	D5+	13
DATA, INPUT, 5-	12	←	D5-	29
DATA, INPUT, 6+	13	←	D6+	14
DATA, INPUT, 6-	14	←	D6-	30
DATA, INPUT, 7+	15	←	D7+	15
DATA, INPUT, 7-	16	←	D7-	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.

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Cabling details for the interface modes

Cabling Requirements (Continued)

Mode 3: Asynchronous Reset (analog)

- **Cable:** IMG-7W2-TO-5BNC and DBHD68-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 the IMG-7W2-TO-5BNC cable (Gray BNC).
- **Connection:** Video input BNC of IMG-7W2-TO-5BNC cable should be connected to VIDEO OUT BNC connector of camera. Connections between the 12-pin connector of the camera and the 68-pin connectors of the Matrox Genesis are as follows:

Cable Adapter Board (68-pin connector)			**PULNiX TM-1020-15 (12-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
EXPOSURE2, OUTPUT, TTL	58	→	TRIG IN	06
GROUND*	25	--	GROUND*	01, 03, 05, or 08

* This connection requires connection to the GND on the Power Supply.

Mode 4: Asynchronous Reset (digital)

- **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 the IMG-7W2-TO-5BNC cable (Gray BNC).
- **Connection:** Connections between the 31-pin connector of the camera and the 100-pin connectors of the Matrox Genesis are as in *Mode 2: Continuous (digital)* including the following additional connection:

GEN-DIG-BRD/R/_ (100-pin connector)			**PULNiX TM-1020-15 (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 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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