

MATROX GENESIS

CAMERA INTERFACE APPLICATION NOTE

PULNiX TM-1020-15

MARCH 13, 2001

Basics about the
camera

Camera Descriptions

- $1008 \times 1018 \times 8\text{-bit}$ @ 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.

Interface Modes

- Continuous
- Asynchronous reset (pulse width control mode)

Camera Interface Briefs

Mode 1: Continuous (analog)

- $1000 \times 1016 \times 8\text{-bit}$ @ 15 fps.
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving video signals from camera.
- DCF used: [GTM1020C.DCF](#)



VIDEO →



Mode 2: Continuous (digital)

- $1006 \times 1016 \times 8\text{-bit}$ @ 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](#)



VIDEO →
LDV →
FDV →
CLK →



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

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

Basics about the
interface modes

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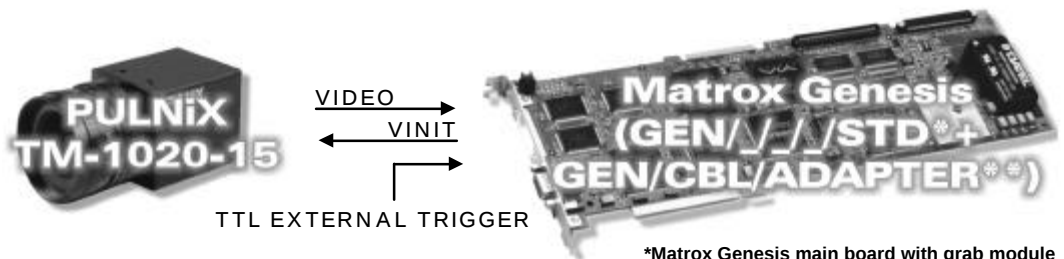
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Basics about the
interface modes

Camera Interface Briefs (continued)

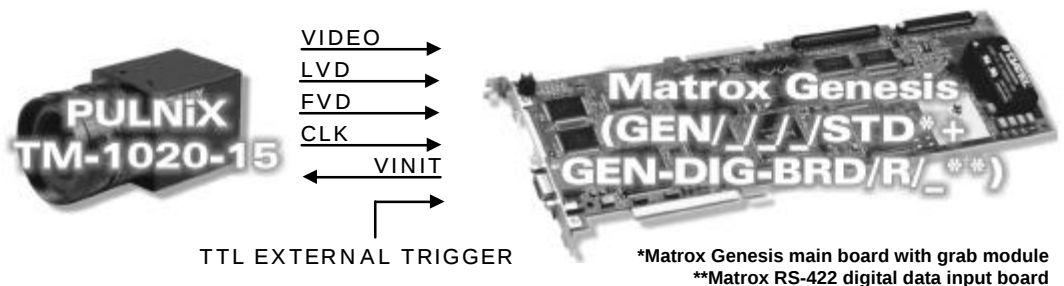
Mode 3: Asynchronous Reset (analog)

- $1000 \times 1016 \times 8$ -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](#)



Mode 4: Asynchronous Reset (digital)

- $1006 \times 1016 \times 8$ -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 (FVD), PIXEL CLOCK (CLK @ 20 MHz) and video signals from camera.
- DCF used: [TM1020DA.DCF](#)



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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 $66.6 \text{ ms} + 13 \text{ ms} () = 79.66 \text{ ms}$. 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.

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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)

Pin name	Pin no.
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EXPOSURE2, OUTPUT, TTL	58
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GROUND*	25
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PULNiX TM-1020-15 (12-pin connector)

Pin name	Pin no.
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TRIG IN	06
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GROUND*	01, 03, 05, or 08
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* 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/RI_ (100-pin connector)

Pin name	Pin no.
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EXPOSURE2, OUTPUT, TTL	88
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PULNiX TM-1020-15 (31-pin connector)

Pin name	Pin no.
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VINIT	20
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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 Systems, 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.

Corporate headquarters:

Canada and U.S.A.

Matrox Electronic Systems Ltd.
1055 St. Regis Blvd.
Dorval, Quebec H9P 2T4
Canada
Tel: (514) 685-2630
Fax: (514) 822-6273

