

MATROX GENESIS

CAMERA INTERFACE APPLICATION NOTE

JAI CV-M40

JANUARY 10, 2002

Basics about the
camera

Camera Descriptions

- Effective resolution: $648 \times 486 \times 8\text{-bit}$ @ 60 fps.
- Single channel analog video output.
- Progressive scan.
- Full and partial frame.
- Internal (composite) or external sync.
- Internal or external exposure control.
- 24.5 MHz pixel clock rate.

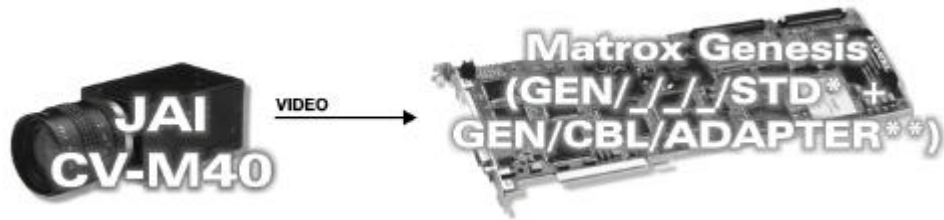
Interface Modes

- Continuous (normal/binning readout, partial scan)
- Asynchronous reset (pulse width control mode)

Camera Interface Briefs

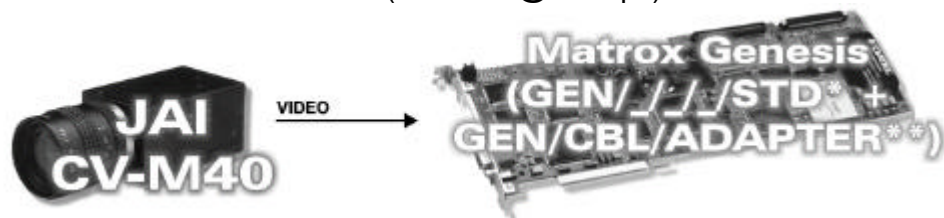
Mode 1: Continuous (normal/binning readout)

- $648 \times 492 \times 8\text{-bit}$ @ 60 fps (normal readout).
- $648 \times 242 \times 8\text{-bit}$ @ 120 fps (binning readout).
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving video signals from camera.
- DCF used: [GVM40N.DCF](#) (normal readout)
- DCF used: [GVM40NBI.DCF](#) (binning readout)



Mode 2: Continuous (partial scan)

- $648 \times$ up to $240 \times 8\text{-bit}$.
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving video signals from camera.
- DCF used: [G40NP240.DCF](#) (648×240 @ 106 fps)
- DCF used: [G40NP120.DCF](#) (648×120 @ 156 fps)
- DCF used: [G40NP60.DCF](#) (648×60 @ 200 fps)
- DCF used: [G40NP30.DCF](#) (648×30 @ 233 fps)



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

Basics about the
interface modes

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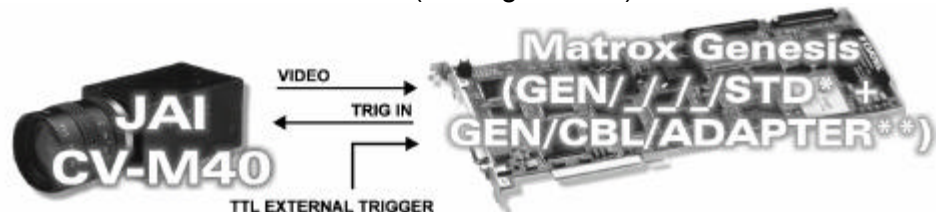
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Basics about the
interface modes

Camera Interface Briefs (continued)

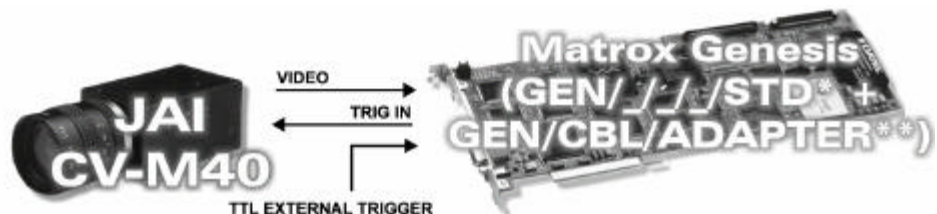
Mode 3: Asynchronous Reset (pulse width control, normal/bin)

- $648 \times 494 \times 8$ -bit (normal readout).
- $648 \times 246 \times 8$ -bit (binning readout).
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving external trigger signal.
- Matrox Genesis sending EXPOSURE1 (TRIGGER INPUT) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving video signals from camera.
- DCF used: [GVM40NAE.DCF](#) (normal readout)
- DCF used: [GVM40NAB.DCF](#) (binning readout)



Mode 4: Asynchronous Reset (pulse width control, partial)

- $648 \times$ up to 240×8 -bit (partial scan).
- Single channel analog video.
- Progressive scan.
- Matrox Genesis receiving external trigger signal.
- Matrox Genesis sending EXPOSURE1 (TRIGGER INPUT) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving video signals from camera.
- DCF used: [G40NAP24.DCF](#) (648×240)
- DCF used: [G40NAP12.DCF](#) (648×120)
- DCF used: [G40NAP60.DCF](#) (648×60)
- DCF used: [G40NAP30.DCF](#) (648×30)



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Specifics about the
interface modes

Camera Interface Details

Mode 1: Continuous (normal/binning readout)

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at 60/120 frames per second (normal/binning readout).
- **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. All internal jumper settings should be set as default. External SW1 switches for this mode should be set as follows:

SW1 Switches	GVM40N.DCF	GVM40NBI.DCF
1: Shutter speed	*	*
2: Shutter speed	*	*
3: Shutter speed	*	*
4: Binning mode	OFF	ON
5: External trigger	OFF	OFF
6: Readout mode	OFF	OFF
7: partial scan mode	OFF	OFF
8: RS232C Interface	OFF	OFF

* switches 1-3 can be set to user desired shutter speed setting, refer to camera manual for details

Mode 2: Continuous (partial scan)

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at up to 233 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. External SW1 switches for this mode (all DCFs) should be set as follows:

SW1 Switches	G40NPxxx.DCF
1: Shutter speed	*
2: Shutter speed	*
3: Shutter speed	*
4: Binning mode	OFF
5: External trigger	OFF
6: Readout mode	OFF
7: partial scan mode	ON
8: RS232C Interface	OFF

* Set to desired shutter speed setting, refer to camera manual for details

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Specifics about the
interface modes

Camera Interface Details (continued)

Mode 2: Continuous (partial scan)

- **Camera switch settings:** Refer to the camera manual for additional information. Internal jumpers for this mode (all DCFs) should be set as follows:

Internal Jumpers settings on PK873B board**				
	240	120	60	30
JP-14	Open	Open	Open	Short
JP-15	Open	Open	Short	Open
JP-16	Open	Short	Open	Open
JP-17	Short	Open	Open	Open

** All other internal jumper settings should be set to default.

Mode 3: Asynchronous Reset (pulse width control, normal/bin)

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The external trigger source initiates the EXPOSURE1 (TRIGGER INPUT) signal. The width (falling edge to rising edge) of EXPOSURE1 (TRIGGER INPUT) signal is the exposure time. A delay of up to **82 ms** is present before the valid video. 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.
- **Camera switch settings:** Refer to the camera manual for additional information. External SW1 switches for this mode should be set as follows:

SW1 Switches	GVM40NAE.DCF	GVM40NAB.DCF
1: Shutter speed	*	*
2: Shutter speed	*	*
3: Shutter speed	*	*
4: Binning mode	OFF	ON
5: External trigger	OFF	OFF
6: Readout mode	ON	ON
7: partial scan mode	OFF	OFF
8: RS232C Interface	OFF	OFF

Set to desired shutter speed setting, refer to camera manual for details

Internal Jumper settings on PK873B board**		
JP5	TRIGGER IN	Short

** All other internal jumper settings should be set to default.

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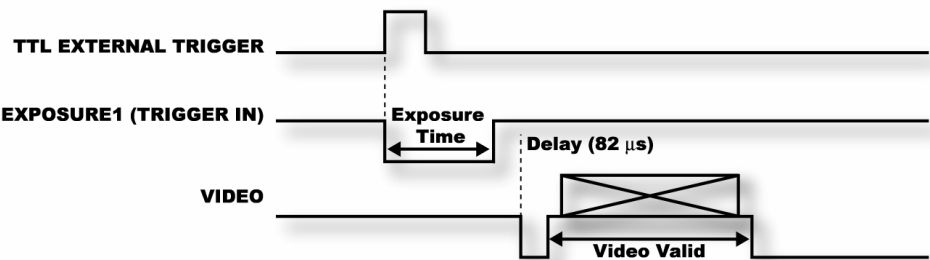
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Specifics about the
interface modes

Camera Interface Details (continued)

Mode 3: Asynchronous Reset (pulse width control, normal/bin)

Timing diagram:



Mode 4: Asynchronous Reset (pulse width control, partial)

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The external trigger source initiates the EXPOSURE1 (TRIGGER INPUT) signal. The width (falling edge to rising edge) of EXPOSURE1 (TRIGGER INPUT) signal is the exposure time. A delay of up to **82 ms** can be present before the valid video. The exposure time can be modified in the DCF using Matrox Intellicam or with the MIL MdigControl() function. Consult the respective manual for more information.
- **Camera switch settings:** Refer to the camera manual for additional information. External SW1 switches and internal jumpers for this mode (all DCFs) should be set as follows:

SW1 Switches	G40NAPxxx.DCF
1: Shutter speed	*
2: Shutter speed	*
3: Shutter speed	*
4: Binning mode	OFF
5: External trigger	OFF
6: Readout mode	ON
7: partial scan mode	ON
8: RS232C Interface	OFF

* Can be set to user desired shutter speed setting, refer to camera manual for details.

Internal Jumpers settings on PK873B board**				
	240	120	60	30
JP-14	Open	Open	Open	Short
JP-15	Open	Open	Short	Open
JP-16	Open	Short	Open	Open
JP-17	Short	Open	Open	Open

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Specifics about the
interface modes

Cabling details for the
interface modes

Camera Interface Details (continued)

Mode 4: Asynchronous Reset (pulse width control, partial)

Internal Jumper settings on PK873B board**		
JP5	TRIGGER IN	Short

** All other internal jumper settings should be set to default.

- **Timing diagram:** Same as in Mode 3: *Asynchronous Reset*.

Cabling Requirements

Modes 1-2: Continuous

- **Cable:** IMG-7W2-TO-5BNC cable required for video, synchronization and control signals. BNC-TO-6/12-pin junction box (e.g. JU-F1) required for synchronization and exposures signals.
- **Connection:** Connections between the 12-pin connector (via BNC-TO-6/12-pin junction box) of the camera and the 7-pin connector of the Matrox Genesis are as follows:

MATROX GENESIS

(BNC connector)

Pin name Pin no.

RED BNC 01

RED BNC (GND) 02

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(12-pin connector)

Pin name Pin no.

VIDEO1 OUTPUT 04

GROUND 05

Modes 3-4: Asynchronous Reset

- **Cable:** IMG-7W2-TO-5BNC and DBHD68-TO-OPEN (open ended) cable required for video, synchronization and control signals. BNC-TO-6/12-pin junction box (e.g. JU-F1) required for synchronization and exposures signals.
- **External trigger:** External trigger source should be connected to TTL trigger input (Gray BNC or pins 1 and 3 on Video Input connector).
- **Connection:** Connections between the 12-pin connector (via BNC-TO-6/12-pin junction box) of the camera and the 7/68-pin connectors of the Matrox Genesis are as Mode 1-2: Continuous, including the following:

CABLE ADAPTER BOARD

(68-pin connector)

Pin name Pin no.

EXPOSURE2, OUTPUT, TTL 58

GROUND 25

JAI CV-A11

(12-pin connector)

Pin name Pin no.

TRIG IN 11

GND 12

MATROX GENESIS

(BNC connector)

Pin name Pin no.

GRAY BNC 01

GRAY BNC (GND) 03

EXTERNAL TRIGGER SOURCE

Pin name Pin no.

SIGNAL --

SIGNAL GROUND --

The DCF(s) mentioned in this application note can be found on the MIL CD or our FTP site ([ftp.matrox.com](ftp: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.

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

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