MATROX METEOR-II/MULTI-CHANNEL
CAMERA INTERFACE APPLICATION NOTE
JAI CV-M40 DECEMBER 7, 2001

Basics about the camera

Camera Descriptions

- Effective resolution: 648 × 486 × 8-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.

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

Interface Modes

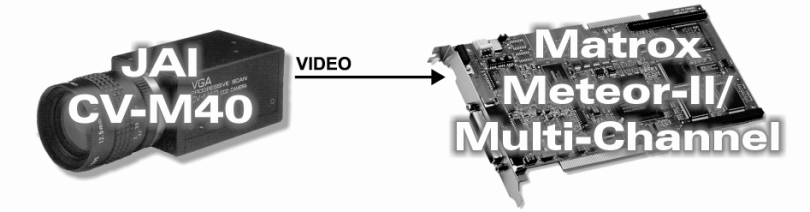
- Continuous (normal/binning readout, partial scan)
- Asynchronous reset (pulse width control mode)

Basics about the interface modes

Camera Interface Briefs

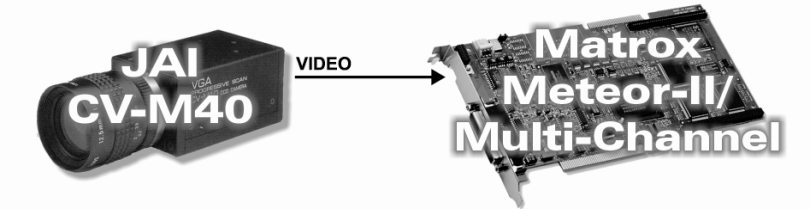
Mode 1: Continuous (normal/binning readout)

- 648 × 492 × 8-bit @ 60 fps (normal readout).
- 648 × 242 × 8-bit @ 120 fps (binning readout).
- Single channel analog video.
- Progressive scan.
- Matrox Meteor-II/Multi-Channel receiving video signals from camera.
- DCF used: CVM40N.DCF (normal readout)
- DCF used: CVM40NBI.DCF (binning readout)



Mode 2: Continuous (partial scan)

- 648 × up to 240 × 8-bit.
- Single channel analog video.
- Progressive scan.
- Matrox Meteor-II/Multi-Channel receiving video signals from camera.
- DCF used: M40NP240.DCF (648 × 240 @ 106 fps)
- DCF used: M40NP120.DCF (648 × 120 @ 156 fps)
- DCF used: M40NP60.DCF (648 × 60 @ 200 fps)
- DCF used: M40NP30.DCF (648 × 30 @ 233 fps)

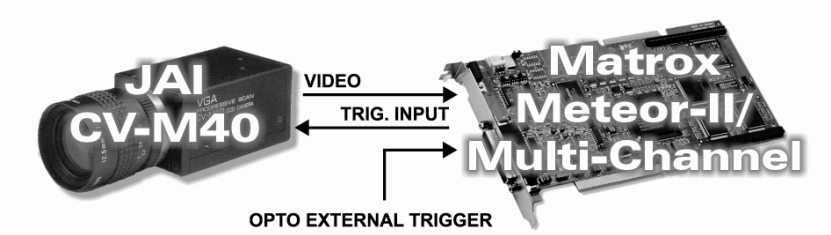


Basics about the interface modes

Camera Interface Briefs (continued)

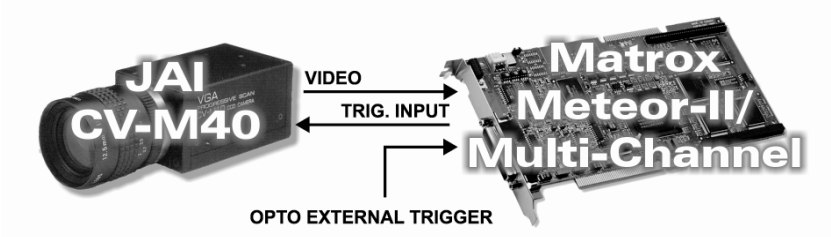
Mode 3: Asynchronous Reset (pulse width control -normal/bin)

- 648 × 494 × 8-bit (normal readout).
- 648 × 246 × 8-bit (binning readout).
- Single channel analog video.
- Progressive scan.
- Matrox Meteor-II/Multi-Channel receiving external trigger signal.
- Matrox Meteor-II/Multi-Channel sending EXPOSURE1 (TRIGGER INPUT) signal to camera to initiate and control exposure time.
- Matrox Meteor-II/Multi-Channel receiving video signals from camera.
- DCF used: CVM40NAE.DCF (normal readout)
- DCF used: CVM40NAB.DCF (binning readout)



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

- 648 × up to 240 × 8-bit (partial scan).
- Single channel analog video.
- Progressive scan.
- Matrox Meteor-II/Multi-Channel receiving external trigger signal.
- Matrox Meteor-II/Multi-Channel sending EXPOSURE1 (TRIGGER INPUT) signal to camera to initiate and control exposure time.
- Matrox Meteor-II/Multi-Channel receiving video signals from camera.
- DCF used: 40NAP240.DCF (648 × 240)
- DCF used: 40NAP120.DCF (648 × 120)
- DCF used: 40NAP60.DCF (648 × 60)
- DCF used: 40NAP30.DCF (648 × 30)



Specifics about the interface modes

Camera Interface Details

Mode 1: Continuous (normal/binning readout)

- **Frame Rate:** Matrox Meteor-II/Multi-Channel 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	CVM40N.DCF	CVM40NBI.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 Meteor-II/Multi-Channel 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	M40NPxxx.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

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** 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 for this mode should be set as follows:

SW1 Switches	CVM40NAE.DCF	CVM40NAB.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**

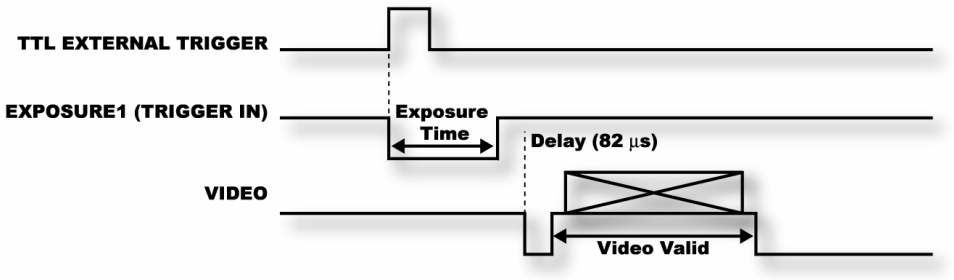
** All other internal jumper settings should be set to default.

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	40NPxxx.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

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 details for the interface modes

Cabling Requirements

Modes 1-2: Continuous

- **Cable:** DH44-TO-8BNC/O (open ended) cable required for video, synchronization and control signals.
- **Connection:** Connections between the 12-pin connector (DC IN/SYNC) of the camera and the 44-pin connector of the Matrox Meteor-II/Multi-Channel are as follows:

METEOR2-MC/4 (44-pin connector)			**JAI CV-M40 (12-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
VID1_IN1	15	←	VIDEO OUT	04
GROUND	17	--	GND	05

Modes 3-4: Asynchronous Reset

- **Cable:** DH44-TO-8BNC/O (open ended) cable required for video, synchronization and control signals.
- **External trigger:** OPTO external trigger signal source should be connected to OPTO trigger input (pins 34 and 35).
- **Connection:** Connections between the 12-pin connector (DC IN/SYNC) of the camera and the 44-pin connector of the Matrox Meteor-II/Multi-Channel are as follows:

METEOR2-MC/4 (44-pin connector)			**JAI CV-M40 (12-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
VID1_IN1	15	←	VIDEO OUT	04
GROUND	17	--	GND	03
EXP(1)	38	←	EXT TRIG IN	06
GROUND	25	--	GND	05

METEOR2-MC/4 (44-pin connector)			**EXTERNAL TRIGGER SOURCE**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
OPTOTRIG+	35	←	SIGNAL	--
OPTOTRIG-	34	←	GROUND	--

The DCF(s) mentioned in this application note can be found on the MIL 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.

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

MATROX IMAGING