MATROX GENESIS
CAMERA INTERFACE APPLICATION NOTE
BASLER A101CP SEPTEMBER 4, 2001

Basics about the camera

Camera Descriptions

- 1300 × 1030 × 8-bit @ 11.75 fps*.
- Single channel LVDS digital video output.
- Bayer Color Filter.
- Progressive scan.
- Internal sync.
- Internal or external exposure control.
- 18 MHz pixel clock rate.

* Higher frame rates available for binning and partial scan modes.

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

Interface Modes

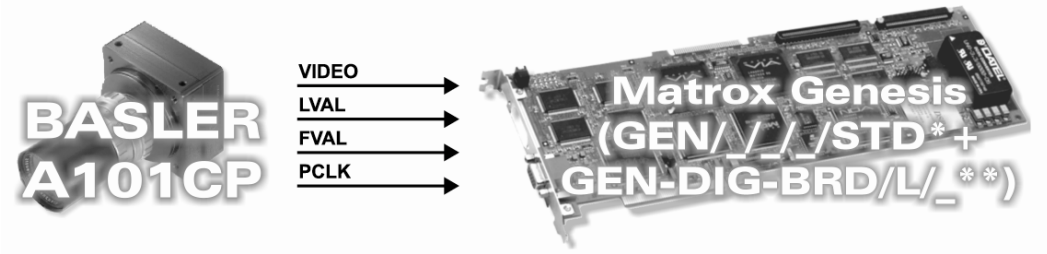
- Pseudo-Continuous (Free-Run) in Full size, Binning or Partial scan
- Asynchronous reset (Level controlled)

Basics about the interface modes

Camera Interface Briefs

Mode 1: Pseudo-Continuous

- Up to 1300 × 1029 × 8-bit @ up to 45 fps.
- Single channel LVDS digital video.
- Progressive scan.
- Matrox Genesis receiving HSYNC (LVAL), VSYNC (FVAL), PIXEL CLOCK (PCLK @ up to 18 MHz) and video signals from camera.
- DCF used: A101CPC.DCF (Full size, 1300 × 1029)
- DCF used: A101CFBC.DCF (Full Binning, 650 × 514)
- DCF used: A101CVBC.DCF (Vertical Binning, 650 × 1029)
- DCF used: A101CHBC.DCF (Horizontal Binning, 1300 × 514)
- DCF used: A101CPSC.DCF (Partial scan, 1300 × 304)



Mode 2: Asynchronous reset

- Up to 1300 × 1029 × 8-bit.
- Single channel LVDS digital video.
- Progressive scan.
- Matrox Genesis receiving external trigger signal.

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Camera Interface Briefs (continued)

Mode 2: Asynchronous reset

- Matrox Genesis sending EXPOSURE1 (EXSYNC) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC (LVAL), VSYNC (FVAL), PIXEL CLOCK (PCLK) and video signals from camera.

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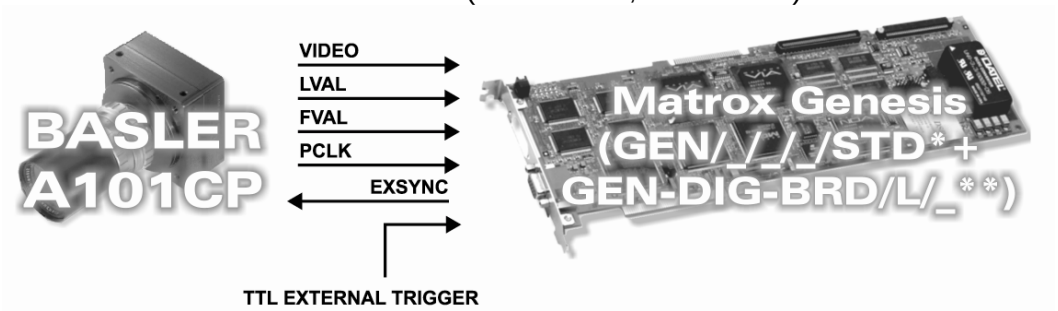
- DCF used: A101CPA.DCF (Full size, 1300 × 1029)
- DCF used: A101CFBA.DCF (Full Binning, 650 × 514)
- DCF used: A101CVBA.DCF (Vertical Binning, 1300 × 514)
- DCF used: A101CHBA.DCF (Horizontal Binning, 650 × 1029)
- DCF used: A101CPSA.DCF (Partial scan, 1300 × 304)



Specifics about the interface modes

Camera Interface Details

Mode 1: Pseudo-Continuous

- **Frame Rate:** Matrox Genesis receives the pseudo-continuous video from the camera at up to 11.75 / 22 / 45 (Full size / binning / partial scan). The frame rate is programmable via the camera's serial interface.
- **Exposure time:** Exposure time is programmed on the camera via the serial interface and determined by the exposure time command. Refer to the camera manual for more information.
- **Bayer Color Filter:** User will need to apply the Bayer color filter following image capture to the host. Color information is generated (by this camera) using a Bayer color mosaic filter mounted on the sensor. RGB information can only be obtained through software-based conversion. Following each frame capture it will be necessary to make a call to the BASLER library from your MIL/MIL-Lite program in order to reconstruct the proper color image. For more information, contact your local Sales representative or Matrox Imaging Technical Support.
- **Camera configuration:** Camera configuration tool and drivers for this camera are available from the BASLER web site (http://www.baslerweb.com/).

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Specifics about the interface modes

Camera Interface Details (continued)

Mode 1: Pseudo-Continuous

- **Camera parameter settings:** Parameters should be set as follows:

	A101CPC	A101CFB	A101CVB	A101CHB	A101PSC
ExpMode	06	36	16	26	04
ExpTime	As desired	As desired	As desired	As desired	As desired
Period	As desired	As desired	As desired	As desired	As desired
PartScan	f f f f	f f f f	f f f f	f f f f	6 4 4 b *
DAC0, DAC1, DAC2	As desired	As desired	As desired	As desired	As desired

Mode 2: Asynchronous Reset

- **Frame rate:** The frame rate is determined by the frequency of the external trigger signal.
- **Exposure time:** The width (falling edge to rising edge) of the EXPOSURE1 (EXSYNC) signal is the exposure time. 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.
- **Bayer Color Filter:** User will need to apply the Bayer color filter following image capture to the host. Color information is generated (by this camera) using a Bayer color mosaic filter mounted on the sensor. RGB information can only be obtained through software-based conversion. Following each frame capture it will be necessary to make a call to the BASLER library from your MIL/MIL-Lite program in order to reconstruct the proper color image. For more information, contact your local Sales representative or Matrox Imaging Technical Support.
- **Camera configuration:** Camera configuration tool and drivers for this camera are available from the BASLER web site (http://www.baslerweb.com/).
- **Camera parameter settings:** Parameters should be set as follows:

	A101CPA	A101CFBA	A101CVB	A101CHBA	A101PSA
ExpMode	03	33	13	23	01
ExpTime	n/a	n/a	n/a	n/a	n/a
Period	n/a	n/a	n/a	n/a	n/a
PartScan	f f f f	f f f f	f f f f	f f f f	6 4 4 b *
DAC0, DAC1, DAC2	As desired	As desired	As desired	As desired	As desired

* defines that the first 401 lines are skipped and next 305 lines are scanned. To scan the next 505 lines, set PartScan to 647d and in Matrox Intellicam, adjust the Vertical Active portion to 504 with a Vertical Frequency of 27.418 kHz. Refer to the respective manual for more information.

Cabling details for the interface modes

Cabling Requirements

Mode 1: Pseudo-Continuous

- **Cable:** DBHD100-TO-OPEN (open ended) cable required for video, synchronization and control signals.
- **Connection:** Connections between the 44-pin connector of the camera and the 100-pin connector of the Matrox Genesis are as follows:

MATROX GENESIS (100-pin connector) *Pin name*	*Pin no.*		**BASLER A101CP (44-pin connector)** *Pin name*	*Pin no.*
DATA INPUT 0+	01	←	DOUT 0	01
DATA INPUT 0-	02	←	/DOUT 0	16
DATA INPUT 1+	03	←	DOUT 1	02
DATA INPUT 1-	04	←	/DOUT 1	17
DATA INPUT 2+	05	←	DOUT 2	03
DATA INPUT 2-	06	←	/DOUT 2	18
DATA INPUT 3+	07	←	DOUT 3	04
DATA INPUT 3-	08	←	/DOUT 3	19
DATA INPUT 4+	09	←	DOUT 4	05
DATA INPUT 4-	10	←	/DOUT 4	20
DATA INPUT 5+	11	←	DOUT 5	06
DATA INPUT 5-	12	←	/DOUT 5	21
DATA INPUT 6+	13	←	DOUT 6	07
DATA INPUT 6-	14	←	/DOUT 6	22
DATA INPUT 7+	15	←	DOUT 7	08
DATA INPUT 7-	16	←	/DOUT 7	23
HSYNC INPUT +	33	←	LVAL	33
HSYNC INPUT -	34	←	/LVAL	34
VSYNC INPUT +	35	←	FVAL	39
VSYNC INPUT -	36	←	/FVAL	40
EXPOSURE 1 OUTPUT +	95*	→	EXSYNC	37*
EXPOSURE 1 OUTPUT -	38*	→	/EXSYNC	38*
GROUND	96	--	GND	43
GROUND	38	--	GND	44
CLOCK INPUT +	39	←	PIXEL CLOCK	35
CLOCK INPUT -	40	←	/PIXEL CLOCK	36

* Connection not necessary for this mode however allows this cable to be used for both modes.

Cabling details for the interface modes

Cabling Requirements (Continued)

Mode 2: Asynchronous Reset

- **Cable:** IMG-7W2-TO-5BNC and DBHD100-TO-OPEN (open ended) cables required for video, synchronization and control signals.
- **Connection:** All connections are as in Mode 1: *Pseudo-continuous.*
- **External Trigger:** TTL external trigger source should be connected to Trigger Input (Gray BNC) of the IMG-7W2-TO-5BNC cable.
- **Power:** Connections between the 2-pin subminiature round connector on the rear panel of the camera and the power supply are as follows:

Power Supply			**BASLER A101CP (2-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
+24V	03	→	GND	01
-24V	04	→	GND	02

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