Matrox Genesis
Camera Interface Application Note
HITACHI KP-F120 July 29, 2002

Basics about the camera

Camera Descriptions

- Effective resolution: 1392 × 1040 × 8 or 10-bit @ 30 fps.
- Single tap analog or dual tap LVDS digital video output.
- Progressive scan.
- Internal or external sync.
- Internal or external exposure control.
- 57.6/28.8 MHz pixel clock rate (analog/digital respectively).

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

Interface Modes

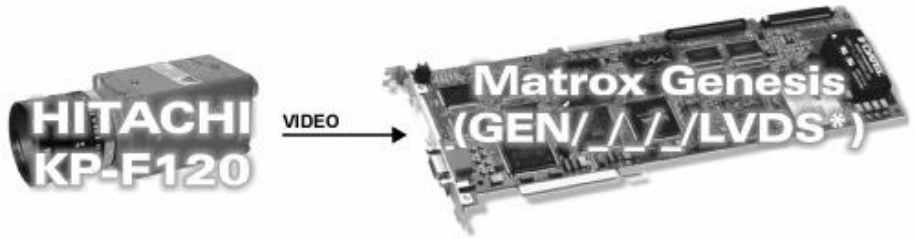
- Continuous
- Asynchronous reset (One timer mode)

Basics about the interface modes

Camera Interface Briefs

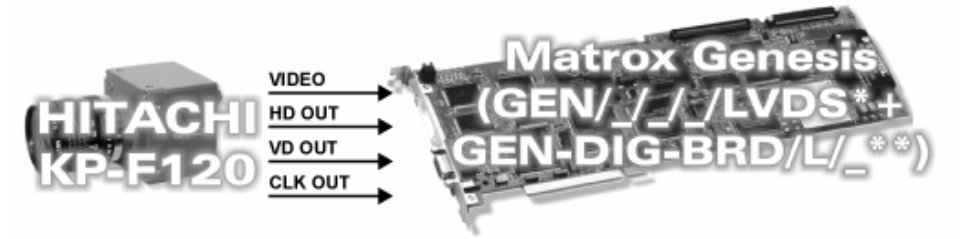
Mode 1: Continuous (analog)

- 1392 × 1040 × 8-bit @ 30 fps.
- Single tap analog video.
- Progressive scan.
- Matrox Genesis receiving video signals from camera.
- DCF used: HTKP120A.DCF



Mode 2: Continuous (digital)

- 1392 × 1040 × 10-bit @ 30 fps.
- Dual tap LVDS video.
- Progressive scan.
- Matrox Genesis receiving HSYNC (HDOUT), VSYNC (VDOUT), PIXEL CLOCK (CLKOUT @ 28.8 MHz) and video signals from camera.
- DCF used: HTKP120D.DCF



***Matrox Genesis main board with LVDS grab module**
****Matrox digital LVDS input board**

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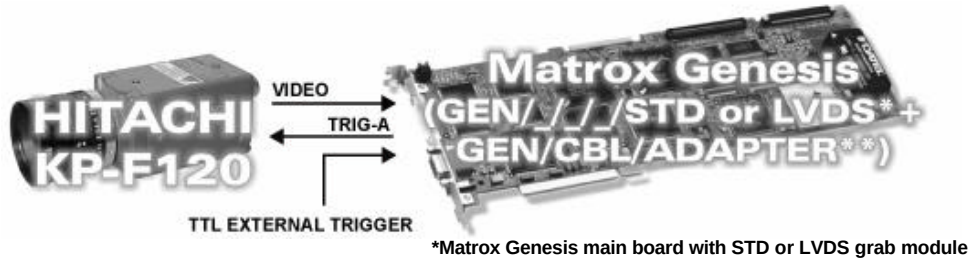
Basics about the interface modes

Camera Interface Briefs (continued)

Mode 3: Asynchronous Reset (One timer mode - analog)

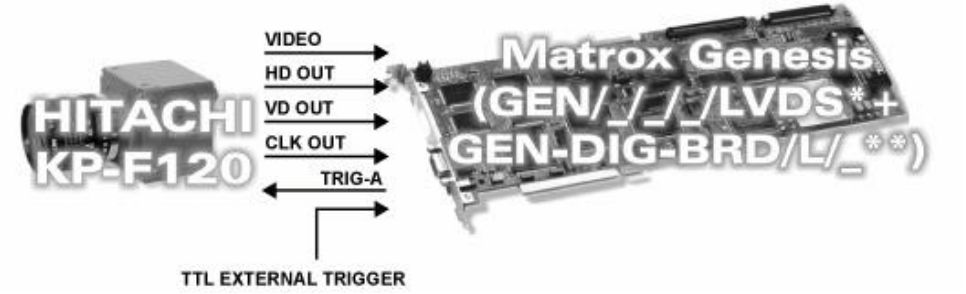
- 1392 × 1040 × 8-bit.
- Single tap analog video.
- Progressive scan.
- Matrox Genesis receiving TTL external trigger signal.
- Matrox Genesis sending EXPOSURE2 (TRIG-A) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving video signals from camera.
- DCF used: HTKP12AA.DCF



***Matrox Genesis main board with STD or LVDS grab module**
****Matrox digital cable adapter board**

Mode 4: Asynchronous Reset (One timer mode - digital)

- 1392 × 1040 × 8-bit.
- Dual tap LVDS digital video.
- Progressive scan.
- Matrox Genesis receiving TTL external trigger signal.
- Matrox Genesis sending EXPOSURE2 (TRIG-A) signal to camera to initiate and control exposure time.
- Matrox Genesis receiving HSYNC (HDOUT), VSYNC (VDOUT), PIXEL CLOCK (CLKOUT @ 28.8 MHz) and video signals from camera.
- DCF used: HTKP12DA.DCF



***Matrox Genesis main board with LVDS grab module**
****Matrox digital LVDS input board**

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Specifics about the interface modes

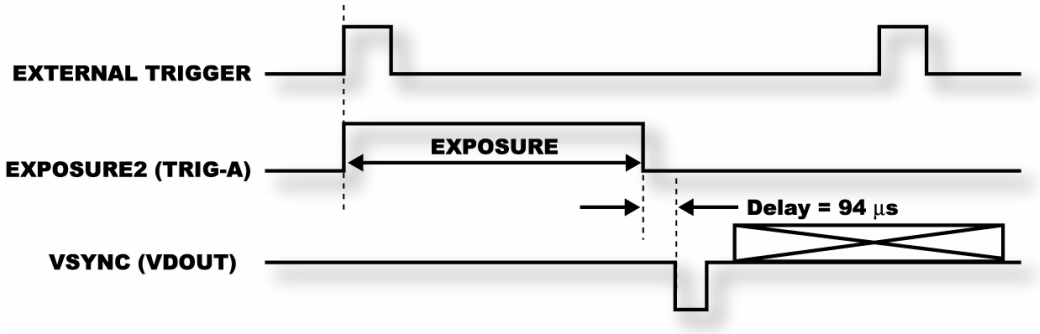
Camera Interface Details

Mode 1 and 2: Continuous (analog/digital)

- **Frame Rate:** Matrox Genesis receives the continuous video from the camera at 30 frames per second.
- **Exposure time:** Exposure time is determined by the rear panel switches or software settings. Refer to the camera manual for more information.
- **Camera control:** Users can control the camera via the serial port using RS-232 compatible signals or by external switches. Refer to the camera manual for more information.

Mode 3 and 4: Asynchronous Reset (analog/digital)

- **Frame rate**: The frame rate is determined by the frequency of the external trigger signal. Maximum possible frame rate for this mode is approximately 30 fps.
- **Exposure time:** The width (rising edge to falling edge) of the EXPOSURE2 (TRIG-A) 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. As per the camera manufacturer, the minimum EXPOSURE2 (TRIG-A) pulse width is equal to **10 ms**.
- **Camera control:** Users can control the camera via the serial port using RS-232 compatible signals or by external switches. Refer to the camera manual for more information.
- **Timing diagram:**



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Cabling details for the interface modes

Cabling Requirements

Mode 1: Continuous (analog)

- **Cable:** IMG-7W2-TO-5BNC cable required for video signals.
- **Connection:** Video Input (Red BNC) of the IMG-7W2-TO-5BNC cable should be connected to the VIDEO OUT BNC of the camera.

Mode 2: Continuous (digital)

- **Cable:** DBHD100-TO-OPEN (open ended) cable required for video, synchronization and control signals.
- **Connection:** Connections between the 50-pin DIGITAL OUT /12-pin DC IN/SYNC connectors of the camera and the 100-pin connectors of the Matrox Genesis Digital LVDS Input board are as follows:

MATROX GENESIS (100-pin connector)			**HITACHI KP-F120 (50-pin connector)**	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
DATA, INPUT, 0+	01	←	DA D0+	26
DATA, INPUT, 0-	02	←	DA D0-	27
DATA, INPUT, 1+	03	←	DA D1+	28
DATA, INPUT, 1-	04	←	DA D1-	29
DATA, INPUT, 2+	05	←	DA D2+	30
DATA, INPUT, 2-	06	←	DA D2-	31
DATA, INPUT, 3+	07	←	DA D3+	32
DATA, INPUT, 3-	08	←	DA D3-	33
DATA, INPUT, 4+	09	←	DA D4+	34
DATA, INPUT, 4-	10	←	DA D4-	35
DATA, INPUT, 5+	11	←	DA D5+	36
DATA, INPUT, 5-	12	←	DA D5-	37
DATA, INPUT, 6+	13	←	DA D6+	38
DATA, INPUT, 6-	14	←	DA D6-	39
DATA, INPUT, 7+	15	←	DA D7+	40
DATA, INPUT, 7-	16	←	DA D7-	41
DATA, INPUT, 8+	17	←	DA D8+	42
DATA, INPUT, 8-	18	←	DA D8-	43
DATA, INPUT, 9+	19	←	DA D9+	44
DATA, INPUT, 9-	20	←	DA D9-	45
HSYNC, INPUT, +	33	←	HD OUT +	25
HSYNC, INPUT, -	34	←	HD OUT -	50
VSYNC, INPUT, +	35	←	VD OUT +	48
VSYNC, INPUT, -	36	←	VD OUT -	49

Continued…

Cabling details for the interface modes

Cabling Requirements (continued)

Mode 2: Continuous (digital)

MATROX GENESIS (100-pin connector) *Pin name*	*Pin no.*		HITACHI KP-F120 (50-pin connector) *Pin name*	*Pin no.*
GROUND	37	--	GND	23
GROUND	38	--	GND	24
CLOCK, INPUT, -	40	←	CLK OUT+	46
CLOCK, INPUT, +	39	←	CLK OUT-	47
DATA, INPUT, 16+	51	←	DB D0+	01
DATA, INPUT, 16-	52	←	DB D0-	02
DATA, INPUT, 17+	53	←	DB D1+	03
DATA, INPUT, 17-	54	←	DB D1-	04
DATA, INPUT, 18+	55	←	DB D2+	05
DATA, INPUT, 18-	56	←	DB D2-	06
DATA, INPUT, 19+	57	←	DB D3+	07
DATA, INPUT, 19-	58	←	DB D3-	08
DATA, INPUT, 20+	59	←	DB D4+	09
DATA, INPUT, 20-	60	←	DB D4-	10
DATA, INPUT, 21+	61	←	DB D5+	11
DATA, INPUT, 21-	62	←	DB D5-	12
DATA, INPUT, 22+	63	←	DB D6+	13
DATA, INPUT, 22-	64	←	DB D6-	14
DATA, INPUT, 23+	65	←	DB D7+	15
DATA, INPUT, 23-	66	←	DB D7-	16
DATA, INPUT, 24+	67	←	DB D8+	17
DATA, INPUT, 24-	68	←	DB D8-	18
DATA, INPUT, 25+	69	←	DB D9+	19
DATA, INPUT, 25-	70	←	DB D9-	20

Mode 3: Asynchronous Reset (One timer mode - 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 should be connected to the TTL trigger input of the IMG-7W2-TO-5BNC cable (Gray BNC).

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Cabling details for the interface modes

Cabling Requirements (continued)

Mode 3: Asynchronous Reset (One timer mode - analog)

- **Connection:** Video Input (Red BNC) of the IMG-7W2-TO-5BNC cable should be connected to the VIDEO OUT of the 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)			HITACHI KP-F120 (12-pin DC IN/SYNC connector)	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
EXPOSURE2, OUTPUT, TTL	58	→	TRIG-A	07
GROUND	60	--	GND	10

Mode 4: Asynchronous Reset (One timer mode - 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 should be connected to the TTL trigger input of the IMG-7W2-TO-5BNC cable (Gray BNC).
- **Connection:** Connections between the 50-pin DIGITAL OUT /12-pin DC IN/SYNC connectors of the camera and the 100-pin/68-pin connectors of the Matrox Genesis are as in *Mode 1: Continuous (digital)* and include the following:

MATROX GENESIS (100-pin connector)			HITACHI KP-F120 (12-pin DC IN/SYNC connector)	
Pin name	***Pin no.***		***Pin name***	***Pin no.***
EXPOSURE2, OUTPUT, TTL	88	→	TRIG-A	07
GROUND	50	--	GND	10

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