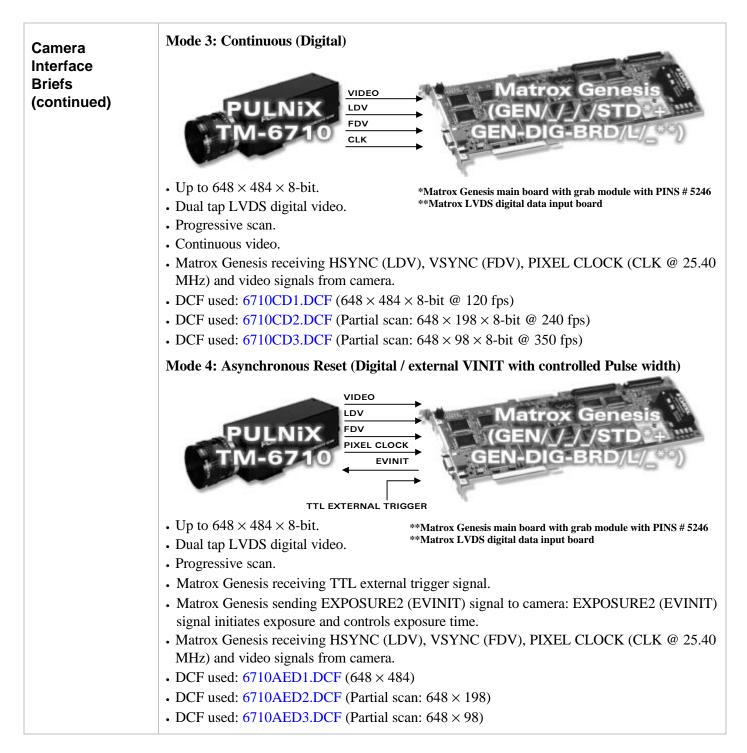
Application Note: Interfacing non-standard cameras to Matrox Genesis

PULNIX TM-6710

Camera Descriptions	 648 × 484 × 8-bit @ up to 120 fps. Single tap analog or dual tap LVDS digital video output. Progressive scan. External or internal exposure control. External sync. Pixel clock rate: 50.98 MHz (Analog) or 25.49 MHz (Digital).
Interface modes	Continuous, Asynchronous Reset (external VINIT with controlled pulse width)
Camera Interface Briefs	Mode 1: Continuous (Analog) VIDEO • Up to 648 × 484 × 8-bit. Mode 1: Continuous (Analog)
	 Single tap analog video. Progressive scan. Continuous video. Matrox Genesis receiving video signals from camera. DCF used: 6710C1.DCF (648 × 484 × 8-bit @ 120 fps) DCF used: 6710C2.DCF (Partial scan: 648 × 198 × 8-bit @ 240 fps) DCF used: 6710C3.DCF (Partial scan: 648 × 98 × 8-bit @ 350 fps)
	Mode 2: Asynchronous Reset (Analog / external VINIT with controlled Pulse width)
	 Up to 648 × 484 × 8-bit. Single tap analog video. Progressive scan. Matrox Genesis receiving TTL external trigger signal. Matrox Genesis sending EXPOSURE2 (EVINIT) signal to camera: EXPOSURE2 (EVINIT) signal initiates exposure and controls exposure time. Matrox Genesis receiving video signals from camera. DCF used: 6710AE1.DCF (648 × 484) DCF used: 6710AE2.DCF (Partial scan: 648 × 198)
	• DCF used: 6710AE3.DCF (Partial scan: 648 × 98)

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Camera	Mode	1: Continuou	ıs (Analog)					
Interface	. Fram	ne rate: Matro	x Genesis rec	eives the cont	tinuous video	from the can	iera at a fram	e rate
								c rate
Details	· •	to 120 frames 10CA2.DCF),	•			-	nd	
	-	sure time: Ex	•	• •	•) or
	deterr	mined by the s	shutter setting.	Refer to the	camera manu	al for more in	nformation	
	• Cam	era switch set	tings: Switch	es for this mo	de should be	set as follow	s:	
		6710C1.DCF		6710C2.DCF	-	6710C3.DCF	=	
		Switches	Settings	Switches	Settings	Switches	Settings	-
		Mode Control	Mode 0	Mode Control	Mode F	Mode Control	Mode E	-
		Up/Down	Toggle Up	Up/Down	Toggle Down	Up/Down	Toggle Up	-
		Shutter	0	Shutter	0	Shutter	0	
	Mode	2: Asynchron	ious Reset (A	nalog / exter	nal VINIT u	vith controlle	d Pulse widt	h)
		-		0				
		e it has receive						E2
	,	NIT) signal to			•			
	• Fran	ne rate: The fr	ame rate is de	termined by	the frequency	of the extern	al trigger sign	nal.
	• Expo	sure time: Th	e low level (p	ulse period) (of the EXPOS	SURE2 (EVI	VIT) signal is	the
	-	sure time. The	-	-			-	
	_ _					A		.DCI),
		3.3 ms (G6710				•		
	deplo	yment time of	f EXPOSURE	2 (EVINIT) ı	use the Expos	sure Settings	menu tab in N	Aatrox
	Intell	icam. Consult	the Matrox In	tellicam Use	r Guide for n	nore informati	on.	
	N #* *			EVDO			11	. 100
		mum exposui	e width: mini	mum EXPOS	SURE2 (EVI	NII) puise wi	ath is equal t	0 100
	IIS.	ana arritah aat	tinga Switch	a for this me	de chould he	ast as follow		
	• Cam	era switch set	ungs: Switch	es for uns mo	de should be	set as follow	8.	
		6710AE1.D	CF	6710AE2.D0	CF	6710AE3.DC	F	
		Switches	Settings	Switches	Settings	Switches	Settings	
		Step 1	eeningo	Step 1	2000190	Step 1		
		Mode Control	Mode F	Mode Control	Mode F	Mode Control	Mode E	
		Up/Down	Toggle Up	Up/Down	Toggle Down	Up/Down	Toggle Up	
		Step 2		Step 2		Step 2		
		Mode Control Up/Down	Mode 8	Mode Control	Mode 8	Mode Control	Mode 8	
		UD/D/Wh	Toggle Down	Up/Down	Toggle Down	Up/Down	Toggle Down	
				Sten 3		Step 3		
		Step 3 Shutter	9	Step 3 Shutter	9	Step 3 Shutter	9	
		Step 3			9		9	
		Step 3			9		9	
	Ex	Step 3			9		9	
	Ex	Step 3 Shutter			9		9	
	Ex	Step 3 Shutter			9		9	
		Step 3 Shutter	9		9		9	
		Step 3 Shutter	9	Shutter	9 Dosure Time		9	
		Step 3 Shutter	9	Shutter	·		9	
		Step 3 Shutter	9	Shutter	·		9	
	Ex	Step 3 Shutter	9	Shutter	·		9	
	Ex	Step 3 Shutter	9	Shutter	·			
	Ex	Step 3 Shutter	9	Shutter	·	Shutter		

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era	infoue of	Continuous	(Digital)				
face ils tinued)	equal to	• Frame rate: Matrox Genesis receives the continuous video from the camera at a frame rate equal to 120 frames per second (G6710CD1.DCF), 240 frames per second (G6710CD2.DCF), or 350 frames per second (G6710CD3.DCF).					
, ,	. Evnosu	re time Evr	osure time is	inversely n	roportionate (to the frame	rate (no shutter)
	-	1	utter setting.	v 1	1		· · · · · · · · · · · · · · · · · · ·
		•	U U				
	• Camer	a switch sett	ings: Switche	es for this m	ode should be	e set as follow	ws:
		6710CD1.D	CF	6710CD2.L	DCF	6710CD3.D	CF
		Switches	Settings	Switches	Settings	Switches	Settings
		Control	Mode F	Control	Mode F	Control	Mode E
				Up/Down		Up/Down	
		Up/Down	Toggle Up		Toggle Down		Toggle Up
		Shutter	0	Shutter	0	Shutter	0
	(EVIN) • Frame • Exposu	IT) signal to rate: The fra ure time: The	the camera w me rate is de low level (p	ith a width e termined by ulse period)	equal to the de the frequency of the EXPO	esired exposi y of the exter SURE2 (EV	mal trigger signa INIT) signal is tl
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The th and deploy Matrox Intelli um exposure	the camera w me rate is det low level (p default expos yment time of cam. Consult	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO	equal to the de the frequency of the EXPO the DCFs is of E2 (EVINIT Intellicam U SURE2 (EVI	esired expose y of the extern SURE2 (EV equal to 26 n) use the Exp ser Guide for (NIT) pulse v	ure time. rnal trigger signal INIT) signal is th ns. In order to ch posure Settings n r more informati- vidth is equal to
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The th and deploy Matrox Intelli um exposure a switch sett	the camera w me rate is det low level (p default expos yment time of cam. Consult width: minin ings: Switche	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this mo	equal to the de the frequency of the EXPO the DCFs is E2 (EVINIT Intellicam U SURE2 (EVI ode should be	esired expose y of the exter SURE2 (EV equal to 26 n) use the Exp ser Guide for (NIT) pulse v e set as follow	The time. The trigger signal INIT) signal is the solution of the triangle solution of the triangle tr
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The th and deploy Matrox Intelli um exposure	the camera w me rate is det low level (p default exposyment time of cam. Consult width: minin ings: Switche <i>CF</i>	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this me 6710AED	equal to the de the frequency of the EXPO the DCFs is a E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF	esired expose y of the extern SURE2 (EV equal to 26 n) use the Exp ser Guide for (NIT) pulse v	The time. The trigger signal INIT) signal is the solution of the term of
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The th and deploy Matrox Intelli um exposure a switch sett 6710AED1.D	the camera w me rate is det low level (p default expos yment time of cam. Consult width: minin ings: Switche	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this mo	equal to the de the frequency of the EXPO the DCFs is E2 (EVINIT Intellicam U SURE2 (EVI ode should be	esired expose y of the exter SURE2 (EV equal to 26 n) use the Exp ser Guide for INIT) pulse v e set as follow 6710AED	The time. The trigger signal INIT) signal is the solution of the triangle solution of the triangle tr
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The th and deploy Matrox Intelli um exposure a switch sett 6710AED1.D Switches	the camera w me rate is det low level (p default exposyment time of cam. Consult width: minin ings: Switche <i>CF</i>	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this me 6710AED Switches	equal to the de the frequency of the EXPO the DCFs is a E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF	esired expose y of the exter SURE2 (EV equal to 26 n) use the Exp ser Guide for INIT) pulse v e set as follow 6710AED Switches	The time. The trigger signal INIT) signal is the solution of the term of
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra ure time: The re time. The th and deploy Matrox Intelli um exposure a switch sett 6710AED1.D Switches Step 1	the camera w me rate is det low level (p default exposignment time of cam. Consult width: minin ings: Switche <i>CF</i> Settings	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this mo 6710AED Switches Step 1	equal to the de the frequency of the EXPO the DCFs is 0 E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF Settings	esired expose y of the exter SURE2 (EV equal to 26 n) use the Exp ser Guide for (NIT) pulse v e set as follow 6710AED Switches Step 1	The time. The trigger signal INIT) signal is the solution of the term of the term of the term of the term of term of the solution of the term of the solution of the term of the solution of the term of the term of the solution of the term of the term of the solution of the term of the term of the term of the solution of the term of term o
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The th and deploy datrox Intelli um exposure a switch sett 6710AED1.D Switches Step 1 Mode Control Up/Down Step 2	the camera w me rate is det low level (p default exposignment time of cam. Consult width: minin ings: Switche <i>CF</i> Settings	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this me 6710AED Switches Step 1 Mode Control	equal to the de the frequency of the EXPO the DCFs is of E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF Settings Mode F	esired expose y of the exter SURE2 (EV equal to 26 m) use the Exp ser Guide for INIT) pulse w e set as follow 6710AED Switches Step 1 Mode Control	ure time. rnal trigger signal INIT) signal is the ns. In order to che possure Settings n r more informative vidth is equal to ws: 3.DCF Settings Mode E
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to a rate: The fra re time: The re time. The th and deploy Matrox Intelli um exposure a switch sett 6710AED1.D Switches Step 1 Mode Control Up/Down	the camera w me rate is det low level (p default exposignment time of cam. Consult width: minin ings: Switche <i>CF</i> Settings	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this ma 6710AED Switches Step 1 Mode Control Up/Down	equal to the de the frequency of the EXPO the DCFs is of E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF Settings Mode F	esired exposury of the extensive of the extensive of the extensive of the extension of the	ure time. rnal trigger signal INIT) signal is the ns. In order to che possure Settings n r more informative vidth is equal to ws: 3.DCF Settings Mode E
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra retime: The retime. The dith and deploy Matrox Intelli um exposure a switch sett 6710AED1.D Switches Step 1 Mode Control Up/Down Step 2 Mode Control Up/Down	the camera w me rate is det low level (p default exposyment time of cam. Consult e width: minin ings: Switche <i>CF</i> Settings Mode F Toggle Up	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this mo 6710AED2 Switches Step 1 Mode Control Up/Down	equal to the de the frequency of the EXPO the DCFs is of E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF Settings Mode F Toggle Down	esired exposu y of the exter SURE2 (EV equal to 26 m) use the Exp ser Guide for (NIT) pulse v e set as follow 6710AED Switches Step 1 Mode Control Up/Down Step 2 Mode Control Up/Down	ure time. rnal trigger signal INIT) signal is the ns. In order to che posure Settings n r more informative width is equal to WS: B.DCF Settings Mode E Toggle Up
	(EVIN: • Frame • Exposu exposu the wid tab in N • Minim ms.	IT) signal to rate: The fra re time: The re time. The dith and deploy Matrox Intelli um exposure a switch sett 6710AED1.D Switches Step 1 Mode Control Up/Down Step 2 Mode Control	the camera w me rate is det low level (p default exposyment time of cam. Consult width: minin ings: Switche <i>CF</i> Settings Mode F Toggle Up Mode 8	ith a width e termined by ulse period) ure time for f EXPOSUR the Matrox mum EXPO es for this me 6710AED Switches Step 1 Mode Control Up/Down Step 2 Mode Control	equal to the de the frequency of the EXPO the DCFs is E2 (EVINIT Intellicam U SURE2 (EVI ode should be 2.DCF Settings Mode F Toggle Down Mode 8	esired expose y of the exter SURE2 (EV equal to 26 m) use the Exp ser Guide for (NIT) pulse v e set as follow 6710AED Switches Step 1 Mode Control Up/Down Step 2 Mode Control	The time. The trigger signal INIT) signal is the source settings in the more information width is equal to WS: 3.DCF Settings Mode E Toggle Up Mode 8

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Cabling	Mode 1: Continuous (Analog)							
Requirements	 IMG-7W2-TO-5NC cable required for video input of camera (single input). Video input of IMG-7W2-TO-5BNC cable should be connected to video out BNC connector of camera. 							
	Mode 2: Asynchronous Reset	(Analog / exter	nal VINI	T with controlled Pulse	width)			
	• IMG-7W2-TO-5NC and DBH TTL external trigger source.							
	• TTL external trigger source she IMG-7W2-TO-5BNC cable (C			TTL external trigger inpu	at of the			
	• Video input of IMG-7W2-TO- of camera.	5BNC cable sh	ould be c	onnected to video out BN	C connector			
	• The connections between the 6 the camera and the power supp GEN/CBL/ADAPTER	-		latrox Genesis, the 12-pir PULNiX TM-6710	a connector of			
	(68-pin connector)			(12-pin connector)				
	Pin name	Pin no.		Pin name	Pin no.			
	EXPOSURE2, OUTPUT, TTL	58	\rightarrow	VINIT in	06			
	GROUND	68		GND	01, 03, or 05			
	+12V			+12V DC	02			
	Mode 3: Continuous (Digital)							
	 DBHD100-TO-OPEN cable as synchronization and control sig Connections between the 51-pi GEN-DIG-BRD/L/_ are as fol 	gnals. n connector of						
	GEN-DIG-BRD/L/_ (100-pin connector)			PULNiX TM-6710 (51-pin connector)				
		Pin no.		Pin name	Pin no.			
	, ,	39	\leftarrow	CLK+	18			
	, ,	40	\leftarrow	CLK-	35			
	, , ,	33	\leftarrow	LVD+	48			
		34	\leftarrow	LVD-	47			
		35	\leftarrow	FVD+	50			
		36	\leftarrow	FVD-	49			
		50		GND	17			
		37		GND	51			
		01	\leftarrow	B0+	02			
		02	\leftarrow	B0-	20			
		03	\leftarrow	B1+	04			
		04	\leftarrow	B1-	22			
	, , ,	05	\leftarrow	B2+	06			
	DATA, INPUT, 2- continued	06	\leftarrow	B2-	24			

Application Note: Interfacing non-standard cameras to Matrox Genesis

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Cabling Requirements (continuous)	GEN-DIG-BRD/L/_ (100-pin connector) <i>Pin name</i>	Pin no.		PULNiX TM-6710 (51-pin connector) <i>Pin name</i>	Pin no.
(continuous)	DATA, INPUT, 3+	07	\leftarrow	B3+	08
	DATA, INPUT, 3-	08	\leftarrow	В3-	26
	DATA, INPUT, 4+	09	\leftarrow	B4+	10
	DATA, INPUT, 4-	10	\leftarrow	B4-	28
	DATA, INPUT, 5+	11	\leftarrow	B5+	12
	DATA, INPUT, 5-	12	\leftarrow	В5-	30
	DATA, INPUT, 6+	13	\leftarrow	B6+	14
	DATA, INPUT, 6-	14	\leftarrow	B6-	32
	DATA, INPUT, 7+	15	\leftarrow	B7+	16
	DATA, INPUT, 7-	16	\leftarrow	B7-	34
	EXPOSURE2, OUTPUT, TTL	88*	\rightarrow	EVINIT	43*
	DATA, INPUT, 8+	17	\leftarrow	A0+	01
	DATA, INPUT, 8-	18	\leftarrow	A0-	19
	DATA, INPUT, 9+	19	\leftarrow	A1+	03
	DATA, INPUT, 9-	20	\leftarrow	A1-	21
	DATA, INPUT, 10+	21	\leftarrow	A2+	05
	DATA, INPUT, 10-	22	\leftarrow	A2-	23
	DATA, INPUT, 11+	23	\leftarrow	A3+	07
	DATA, INPUT, 11-	24	\leftarrow	A3-	25
	DATA, INPUT, 12+	25	\leftarrow	A4+	09
	DATA, INPUT, 12-	26	\leftarrow	A4-	27
	DATA, INPUT, 13+	27	\leftarrow	A5+	11
	DATA, INPUT, 13-	28	\leftarrow	A5-	29
	DATA, INPUT, 14+	29	\leftarrow	A6+	13
	DATA, INPUT, 14-	30	\leftarrow	Аб-	31
	DATA, INPUT, 15+	31	\leftarrow	A7+	15
	DATA, INPUT, 15-	32	\leftarrow	A7-	33

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September 25, 2000

Cabling Requirements (continuous)	 Mode 4: Asynchronous Reset (Digital / external VINIT with controlled Pulse width) DBHD100-TO-OPEN and IMG-7W2-TO-5BNC cables, and GEN/DIG/BRD/L/_ board required for external trigger, digital data, synchronization, and control signals. TTL external trigger source should be connected to the TTL trigger input of the IMG-7W2-TO-5BNC cable (Gray BNC wire). Connections between the 51-pin connector of the camera and the 100-pin connector of the GEN-DIG-BRD/L/_ are as in <i>Mode 3: Continuous</i> (Digital).
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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). 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

