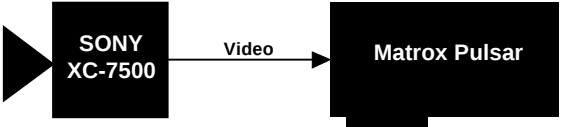
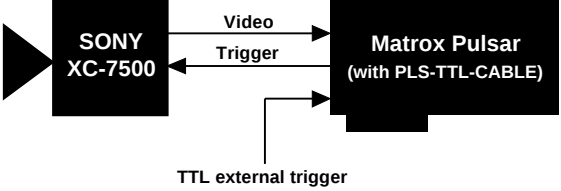
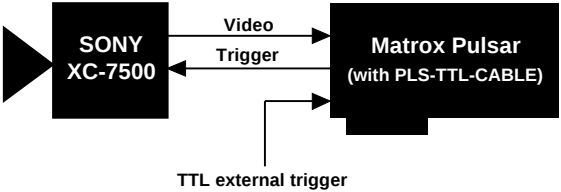


Application Note:

Interfacing non-standard cameras to Matrox Pulsar

Sony XC-7500

March 1, 1996

Camera Interface Overview	• 640 x 480 x 8-bit (RS-170) • Analog video output • Non-interlaced • Internal (composite) sync • Internal or external exposure control • 3 modes: continuous, asynchronous reset, asynchronous high speed shutter
Camera Interface Details	1. Continuous mode • 640 x 480 x 8-bit (RS-170) @ 30fps • Analog (composite) video output • Non-interlaced • Internal exposure control (normal shutter mode; normal speed) • Continuous video • DCF used: XC7500N.DCF  2. Asynchronous reset mode (E-DONPISHA) • 640 x 240 x 8-bit (RS-170) @ 60fps (max) • Analog (composite) video output • Non-interlaced • Internal exposure control (E-DONPISHA shutter mode; normal speed) • Matrox Pulsar receiving TTL external trigger • Matrox Pulsar sends TTL EXPOSURE1 (Trigger) signal to trigger input of camera to initiate exposure • DCF used: XC7500A.DCF  3. Asynchronous high speed shutter mode (E-DONPISHA) • 640 x 240 x 8-bit (RS-170) @ 60fps (max) • Analog (composite) video output • Non-interlaced • External exposure control (E-DONPISHA shutter mode; high speed) • Matrox Pulsar receiving TTL external trigger • Matrox Pulsar sends TTL EXPOSURE1 (Trigger) signal to trigger input of camera. The active edge of the EXPOSURE1 signal initiates exposure; the setting of the S6 switch on the SG-235 board inside the camera minus the width of the EXPOSURE1 signal is the exposure time • DCF used: XC7500AH.DCF 

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Sony XC-7500

March 1, 1996

Cabling Requirements	1. Continuous mode																				
	• IMG-7W2-TO-1BNC required • Video input BNC of IMG-7W2-TO-1BNC cable should be connected to VIDEO OUT BNC connector of camera • Switch settings (switches on rear panel of camera): SIGNAL switch: 1N (non-interlaced mode; one video output) SHUTTER switch: N (normal shutter mode) GAIN switch: F (fixed gain mode)																				
	2. Asynchronous reset mode (E-DONPISHA)																				
	• IMG-7W2-TO-5BNC cable and PLS-TTL-CABLE required • Video input BNC of IMG-7W2-TO-5BNC cable should be connected to VIDEO OUT BNC connector of camera • Switch settings (switches on rear panel of camera): SIGNAL switch: 2N (non-interlaced mode; two video outputs) or 2I (interlaced mode; two video outputs) SHUTTER switch: ED (E-DONPISHA shutter mode) GAIN switch: F (fixed gain mode) • The connections between the DB-37 connector of the PLS-TTL-CABLE and the 6-pin lens connector of the camera are as follows:																				
	<table><tr><td colspan="2">PLS-TTL-CABLE (DB-37 connector)</td><td></td><td colspan="2">SONY XC-7500 (6-pin lens connector)</td></tr><tr><td>Pin name</td><td>Pin no.</td><td></td><td>Pin name</td><td>Pin no.</td></tr><tr><td>TTL_EXPOSURE1</td><td>9</td><td>→</td><td>Ext. trigger input</td><td>2</td></tr><tr><td>GROUND</td><td>7</td><td></td><td>Ground</td><td>3</td></tr></table>	PLS-TTL-CABLE (DB-37 connector)			SONY XC-7500 (6-pin lens connector)		Pin name	Pin no.		Pin name	Pin no.	TTL_EXPOSURE1	9	→	Ext. trigger input	2	GROUND	7		Ground	3
	PLS-TTL-CABLE (DB-37 connector)			SONY XC-7500 (6-pin lens connector)																	
	Pin name	Pin no.		Pin name	Pin no.																
	TTL_EXPOSURE1	9	→	Ext. trigger input	2																
	GROUND	7		Ground	3																
	• TTL external trigger source should be connected to the TTL Trigger Input of the IMG-7W2-TO-5BNC cable																				
3. Asynchronous high speed shutter mode (E-DONPISHA)																					
• IMG-7W2-TO-5BNC cable and PLS-TTL-CABLE required • Video input BNC of IMG-7W2-TO-5BNC cable should be connected to VIDEO OUT BNC connector of camera • Switch settings (switches on rear panel of camera): SIGNAL switch: 2N (non-interlaced mode; two video outputs) or 2I (interlaced mode; two video outputs) SHUTTER switch: ED (E-DONPISHA shutter mode) GAIN switch: F (fixed gain mode) • The connections between the DB-37 connector of the PLS-TTL-CABLE and the 6-pin lens connector of the camera are as in asynchronous reset mode. • TTL external trigger source should be connected to the TTL Trigger Input of the IMG-7W2-TO-5BNC cable																					

Application Note:

Interfacing non-standard cameras to Matrox Pulsar

Sony XC-7500

March 1, 1996

Special Considerations	1. Continuous mode (normal shutter mode; normal speed) • Shutter speeds range from (1/125)s to (1/11 000)s; select the shutter speed by setting the S2 switch on the MB-612 board inside the camera. Consult the Sony XC-7500 manual (p.34) as to the positions of this switch in addition to the corresponding exposure times 2. Asynchronous reset mode (E-DONPISHA shutter mode; normal speed) • Select the RESET DONPISHA mode by setting the S7-3 switch on the SG-235 board inside the camera to ON • Select a 1V video output by setting the S7-2 switch on the SG-235 board inside the camera to OFF; the video signals are output one vsync pulse after the active edge of the EXPOSURE1 signal • Shutter speeds range from (1/1000)s to (1/11 000)s; select the shutter speed by setting the S6 switch on the SG-235 board inside the camera. Consult the Sony XC-7500 manual (p.22) as to the positions of this switch in addition to the corresponding exposure times 3. Asynchronous high speed shutter mode (E-DONPISHA shutter mode; high speed) • Select the RESET DONPISHA mode by setting the S7-3 switch on the SG-235 board inside the camera to ON • Select a 1V video output by setting the S7-2 switch on the SG-235 board inside the camera to OFF; the video signals are output one vsync pulse after the EXPOSURE1 signal • Select high speed shutter mode by setting the S7-5 switch on the SG-235 board inside the camera to ON and the S7-6 switch to OFF • Shutter speeds compatible with this function range from (1/10 000)s to (1/100 000)s. In order to select the shutter speed, set the S6 switch on the SG-235 board inside the camera to a time T1 where $T1 \leq (1/10\,000)s$ and set the EXPOSURE1 pulse width T2 such that $T2 \geq T1$. The exposure time $T3 = T1 - T2$ or exposure time = exposure time set on S6 of SG-235 - length of EXPOSURE1 pulse ; the default width of the EXPOSURE1 pulse (T2) is 71.5μs. Consult the Sony XC-7500 manual (p.22) as to the positions of the above internal switch in addition to the corresponding exposure times • The DCF must be modified at the hardware register level. A hardware register editor is provided by running Intellicam with the -hwreg option (specifically by running INTELCAM -hwreg). An additional menu item, "HW REGISTER EDITOR," appears on the main menu screen. The following registers are used to define the EXPOSURE1 pulse width: CTRL_SET1CNTL CTRL_SET1CNTH CTRL_T1STARTL CTRL_T1STARTH
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Application Note:

Interfacing non-standard cameras to Matrox Pulsar

Sony XC-7500

March 1, 1996

These last are two 16-bit registers that have been split in two: the low byte and the high byte. To set these registers, note first that CTRL_SET1CNTL must be equal to CTRL_T1STARTL and that CTRL_SET1CNTH must be equal to CTRL_T1STARTH; this minimizes the delay between the time the Pulsar receives the external trigger signal and the time it sends the EXPOSURE1 signal to the camera. These values must be in pixels and must be set in hexadecimal; the value of each 16-bit register can vary between 0 (0000 in Hex) and 65 535 (FFFF in Hex). Remember that the EXPOSURE1 pulse width (T2) must be less than the exposure time setting on the S6 switch of the SG-235 board (T1). The default width of the EXPOSURE1 pulse (T2) is 1024 pixels, which in hexadecimal is 400; at a clock rate of 14.318MHz, this corresponds to a time of 71.5µs. Here the low byte corresponds to 0H and the high byte to 4H. The registers are set in the following way:

CTRL_SET1CNTL	0H
CTRL_SET1CNTH	4H
CTRL_T1STARTL	0H
CTRL_T1STARTH	4H

When computing the hardware registers, the following question may be asked: Some registers have been manually edited. Ok to overwrite them all? (y/n)? Answer **no** to this question and to all questions that follow.

IMPORTANT! Please consult Matrox Imaging Applications at 514-822-6061 before using Matrox Intellicam in this manner.

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