

Application Note:

Interfacing non-standard cameras to Matrox Genesis

TOSHIBA IK-542XD

March 16, 2000

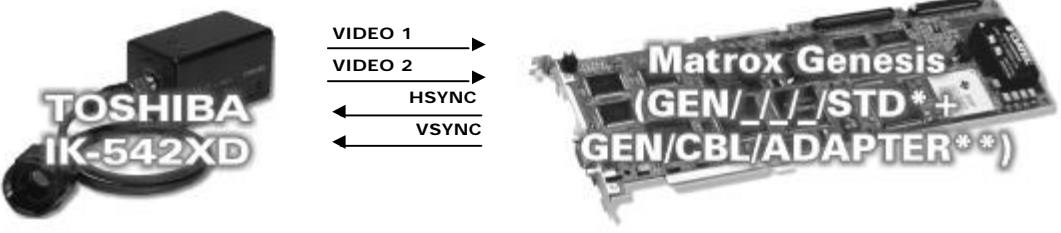
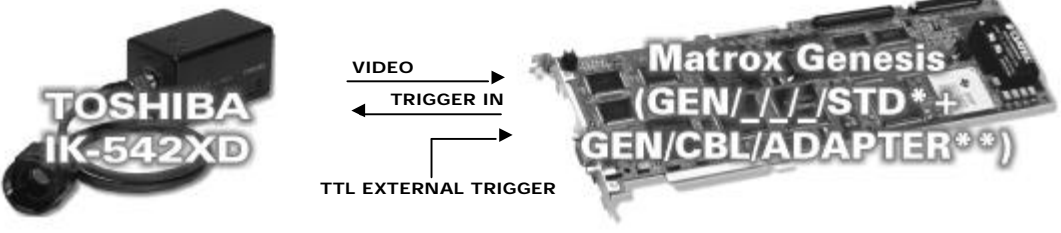
Camera Descriptions	<ul style="list-style-type: none"> • 659 x 494 x 8-bit @ up to 60 fps. • Single or dual tap analog video output. • Interlaced or progressive scan. • Internal (composite) or external sync. • Internal or external exposure control. • Pixel clock rate: 12.2727 MHz
Interface modes	<ul style="list-style-type: none"> • Continuous, Asynchronous Reset (1-Pulse Trigger SYNC Reset mode)
Camera Interface Briefs	<p>Mode 1: Continuous (Genesis Slave, Single Tap)</p> <div data-bbox="412 688 1463 919"> </div> <ul style="list-style-type: none"> • 640 x 480 x 8-bit @ 30 fps • Single tap analog video. • Interlaced or Progressive scan. • Matrox Genesis receiving continuous video from camera. • DCF used: GIK542CI.DCF (Interlaced scan) • DCF used: GIK542CP.DCF (Progressive scan) <p>Mode 2: Continuous (Genesis Slave, Dual Tap)</p> <div data-bbox="412 1234 1463 1465"> </div> <ul style="list-style-type: none"> • 640 x 480 x 8-bit @ 60 fps • Dual tap analog video. • Progressive scan. • Matrox Genesis receiving continuous video from camera. • DCF used: GIK542C2.DCF <p>* Matrox Genesis main board with grab module ** Matrox cable adapter module</p>

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<p>Camera Interface Briefs (continued)</p>	<p>Mode 3: Continuous (Genesis Master, Dual Tap)</p>  <ul style="list-style-type: none"> • 644 x 480 x 8-bit @ 60 fps • Dual tap analog video. • Progressive scan. • Matrox Genesis sending HSYNC, VSYNC signals to camera. • Matrox Genesis receiving continuous video from camera. • DCF used: GIK542CM.DCF <p>Mode 4: Asynchronous Reset (1-Pulse Trigger SYNC Reset mode)</p>  <ul style="list-style-type: none"> • 644 x 480 x 8-bit • Single or dual tap analog video. • Progressive scan. • Internal exposure control. • Matrox Genesis receiving TTL external trigger. • Matrox Genesis sending EXPOSURE1 (TRIGGER IN) signal to camera; the EXPOSURE1 (TRIGGER IN) signal initiates exposure. • Matrox Genesis receiving video signals from camera. • DCF used: GIK542A1.DCF (Single tap) • DCF used: GIK542A2.DCF (Dual tap)
<p>Camera Interface Details</p>	<p>Modes 1 and 2: Continuous (Genesis Slave, Single or Dual Tap)</p> <ul style="list-style-type: none"> • Frame rate: Matrox Genesis receives the continuous video from the camera at 30 frames per second (Single Tap mode) or 60 frames per second (Dual Tap mode). • Exposure time: Exposure time is inversely proportionate to the frame rate or determined by the shutter setting. Refer to the camera manual for more information.

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Camera Interface Details (continued)	<p>Mode 3: Continuous (Genesis Master, Dual Tap)</p> <ul style="list-style-type: none"> • Frame rate: Matrox Genesis receives the continuous video from the camera at 60 frames per second. • Exposure time: Exposure time is inversely proportionate to the frame rate or determined by the shutter setting. Refer to the camera manual for more information. • Camera Switch Settings: External and internal switches should be set as follows: <p>Modes 1-3: Continuous</p> <table border="1"> <thead> <tr> <th colspan="2">External Switches (camera rear)</th></tr> <tr> <th>Name</th><th>Setting</th></tr> </thead> <tbody> <tr> <td>GAIN</td><td>OFF</td></tr> <tr> <td>SHUTTER</td><td>O-E</td></tr> <tr> <td>SELECT</td><td>1/30*</td></tr> </tbody> </table> <p>* 1/30I or 1/30N for Mode 1, 1/60N for Modes 2 and Mode3</p> <table border="1"> <thead> <tr> <th colspan="2">Internal Switches</th></tr> <tr> <th>Board/Switch</th><th>Setting</th></tr> </thead> <tbody> <tr> <td>S101</td><td>1.0</td></tr> <tr> <td>S201</td><td></td></tr> <tr> <td>1-6</td><td>OFF</td></tr> <tr> <td>S202</td><td>OPT, TTL</td></tr> </tbody> </table> <p>Mode 4: Asynchronous Reset (1-Pulse Trigger SYNC Reset mode)</p> <ul style="list-style-type: none"> • Once it has received the external trigger signal, Matrox Genesis sends the EXPOSURE1 (TRIGGER IN) signal to the camera to initiate exposure. • Frame rate: The frame rate is determined by the frequency of the external trigger signal. • Exposure time: The rising edge of EXPOSURE1 (TRIGGER IN) signal initiates the exposure time for a period determined by the shutter speed setting. The default exposure time for this DCF is equal to 1 ms. In order to change the deployment time of the EXPOSURE1 (TRIGGER IN) use the Exposure Settings menu tab in Matrox Intellicam. Consult the Matrox Intellicam User Guide for more information. • Camera Switch Settings: External and internal switches should be set as follows: <p>Mode 4: Asynchronous</p> <table border="1"> <thead> <tr> <th colspan="2">External Switches (camera rear)</th></tr> <tr> <th>Name</th><th>Setting</th></tr> </thead> <tbody> <tr> <td>GAIN</td><td>OFF</td></tr> <tr> <td>SHUTTER</td><td>1</td></tr> <tr> <td>SELECT</td><td>*</td></tr> </tbody> </table> <p>* 1/30n (single tap) or 1/60n (dual-tap)</p> <table border="1"> <thead> <tr> <th colspan="2">Internal Switches</th></tr> <tr> <th>Board/Switch</th><th>Setting</th></tr> </thead> <tbody> <tr> <td>S101</td><td>1.0</td></tr> <tr> <td>S201</td><td></td></tr> <tr> <td>1</td><td>OFF</td></tr> <tr> <td>2-6</td><td>ON</td></tr> <tr> <td>S202</td><td>OPT</td></tr> </tbody> </table>	External Switches (camera rear)		Name	Setting	GAIN	OFF	SHUTTER	O-E	SELECT	1/30*	Internal Switches		Board/Switch	Setting	S101	1.0	S201		1-6	OFF	S202	OPT, TTL	External Switches (camera rear)		Name	Setting	GAIN	OFF	SHUTTER	1	SELECT	*	Internal Switches		Board/Switch	Setting	S101	1.0	S201		1	OFF	2-6	ON	S202	OPT
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Cabling Requirements	<p>Modes 1 and 2: Continuous Mode (Genesis Slave, Single/Dual Tap)</p> <ul style="list-style-type: none"> • IMG-7W2-TO-5BNC required for video output of camera. • The connections between the analog video input connector of Matrox Genesis and the 12-pin connector (DC IN/SYNC) of the camera are as follows: <p>Green BNC → Video Output 1 (pin 4), Red BNC → Video Output 2 (pin 9)*</p> <p>* Note that this connection is not required for the single tap mode however allows this cable to be used with all modes.</p>																																														

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TOSHIBA IK-542XD
March 16, 2000
Cabling Requirements (continued)
Mode 3: Continuous Mode (Genesis Master, Dual Tap)

- IMG-7W2-TO-5BNC and DBH68-TO-OPEN cables required for video output of camera and synchronization signals.
- The connections between the analog video input connector of Matrox Genesis and the 12-pin connector (**DC IN/SYNC**) of the camera are as follows:

Green BNC → Video Output 1 (pin 4), Red BNC → Video Output 2 (pin 9)

- The connections between the Matrox Genesis digital cable adapter board and the 12-pin connector (**DC IN/SYNC**) of the camera are as follows:

Matrox Genesis (68-pin connector)		TOSHIBA IK-542/542XD (12-pin connector)	
<i>Pin name</i>	<i>Pin no.</i>	<i>Pin name</i>	<i>Pin no.</i>
HSYNC, OUTPUT, TTL	62	→	HD INPUT 06
VSNC, OUTPUT, TTL	26	→	VD INPUT 07

Mode 4: Asynchronous Reset (1-Pulse Trigger SYNC Reset mode)

- IMG-7W2-TO-5BNC and DBH68-TO-OPEN cables required for video output of camera and synchronization signals.
- TTL external trigger source should be connected to the TTL trigger input of the IMG-7W2-TO-5BNC cable.
- The connections between the analog video input connector of Matrox Genesis and the 12-pin connector (**DC IN/SYNC**) of the camera are as follows:

Green BNC → Video Output 1 (pin 4), Red BNC → Video Output 2 (pin 9)*

* Note that this connection is not required for Mode 1 (interlaced) however allows this cable to be used with all modes.

- The connections between the Matrox Genesis digital cable adapter board and the 12-pin lens connector (**DC IN/SYNC**) of the camera are as follows:

Matrox Genesis (68-pin connector)		TOSHIBA IK-542/542XD (12-pin connector)	
<i>Pin name</i>	<i>Pin no.</i>	<i>Pin name</i>	<i>Pin no.</i>
EXPOSURE1, OUTPUT, TTL	24	→	TRIGGER IN 11

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](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 Imaging Applications at 514-822-6061 for assistance.

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