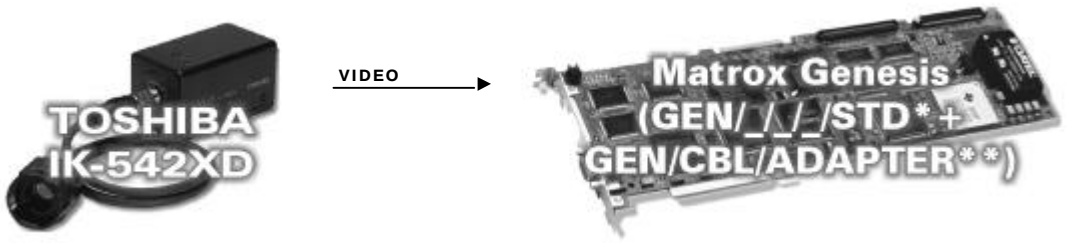
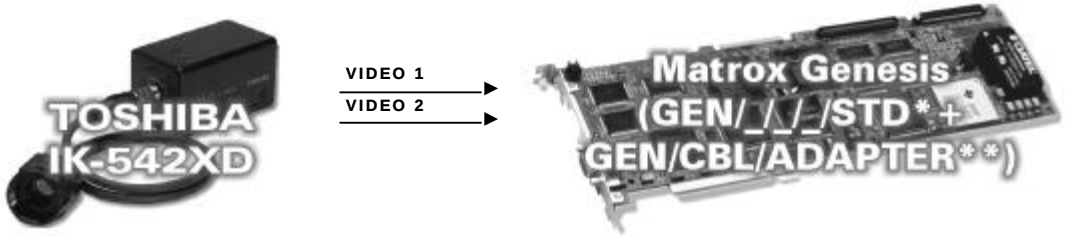
# Application Note:
## Interfacing non-standard cameras to Matrox Genesis

MATROX GENESIS

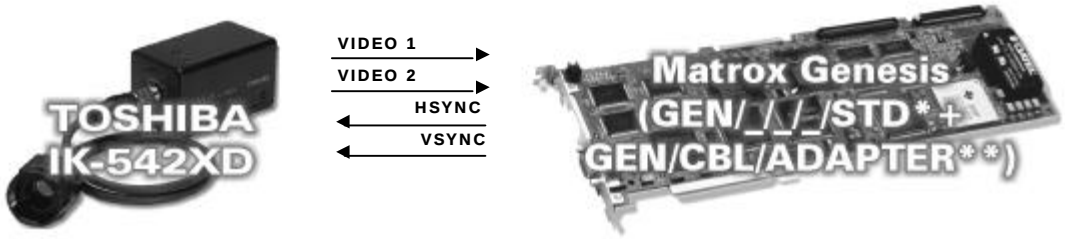
## TOSHIBA IK-542XD

**March 16, 2000**

| | |
|---|---|
| **Camera Descriptions** | • 659 x 494 x 8-bit @ up to 60 fps.<br>• Single or dual tap analog video output.<br>• Interlaced or progressive scan.<br>• Internal (composite) or external sync.<br>• Internal or external exposure control.<br>• Pixel clock rate: 12.2727 MHz |
| **Interface modes** | • Continuous, Asynchronous Reset (1-Pulse Trigger SYNC Reset mode) |
| **Camera Interface Briefs** | **Mode 1: Continuous (Genesis Slave, Single Tap)**<br>  <br>*** Matrox Genesis main board with grab module**<br>**** Matrox cable adapter module**<br>• 640 x 480 x 8-bit @ 30 fps<br>• Single tap analog video.<br>• Interlaced or Progressive scan.<br>• Matrox Genesis receiving continuous video from camera.<br>• DCF used: GIK542CI.DCF (Interlaced scan)<br>• DCF used: GIK542CP.DCF (Progressive scan)<br><br>**Mode 2: Continuous (Genesis Slave, Dual Tap)**<br>  <br>*** Matrox Genesis main board with grab module**<br>**** Matrox cable adapter module**<br>• 640 x 480 x 8-bit @ 60 fps<br>• Dual tap analog video.<br>• Progressive scan.<br>• Matrox Genesis receiving continuous video from camera.<br>• DCF used: GIK542C2.DCF |

**Camera Interface Briefs (continued)**

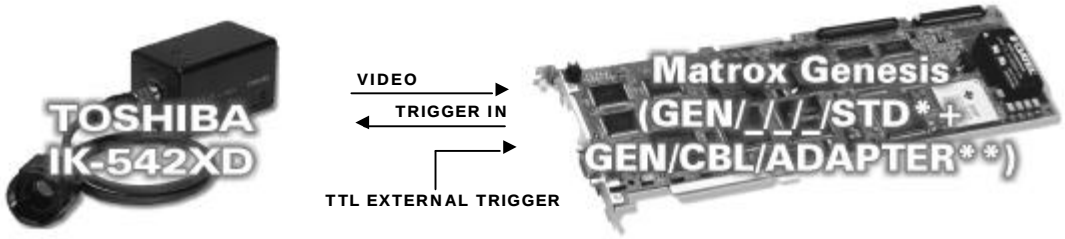
**Mode 3: Continuous (Genesis Master, Dual Tap)**




*** Matrox Genesis main board with grab module**
**** Matrox cable adapter module**

- 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

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




*** Matrox Genesis main board with grab module**
**** Matrox cable adapter module**

- 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)

**Camera Interface Details**

**Modes 1 and 2: Continuous (Genesis Slave, Single or Dual Tap)**

- **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.

**Camera Interface Details (continued)**

**Mode 3: Continuous (Genesis Master, Dual Tap)**

- **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:

Modes 1-3: Continuous

| External Switches (camera rear) | |
|---|---|
| ***Name*** | ***Setting*** |
| GAIN | OFF |
| SHUTTER | O-E |
| SELECT | 1/30* |

* 1/30I or 1/30N for Mode 1, 1/60N for Modes 2 and Mode3

| Internal Switches | |
|---|---|
| ***Board/Switch*** | ***Setting*** |
| S101 | 1.0 |
| S201 | |
| 1-6 | OFF |
| S202 | OPT, TTL |

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

- 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:

Mode 4: Asynchronous

| External Switches (camera rear) | |
|---|---|
| ***Name*** | ***Setting*** |
| GAIN | OFF |
| SHUTTER | 1 |
| SELECT | * |

* 1/30n (single tap) or 1/60n (dual-tap)

| Internal Switches | |
|---|---|
| ***Board/Switch*** | ***Setting*** |
| S101 | 1.0 |
| S201 | |
| 1 | OFF |
| 2-6 | ON |
| S202 | OPT |

**Cabling Requirements**

**Modes 1 and 2: Continuous Mode (Genesis Slave, Single/Dual Tap)**

- 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:

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

* Note that this connection is not required for the single tap mode however allows this cable to be used with all modes.

**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)** | |
|---|---|---|---|---|
| ***Pin name*** | ***Pin no.*** | | ***Pin name*** | ***Pin no.*** |
| HSYNC, OUTPUT, TTL | 62 | → | HD INPUT | 06 |
| VSYNC, 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)** | |
|---|---|---|---|---|
| ***Pin name*** | ***Pin no.*** | | ***Pin name*** | ***Pin no.*** |
| EXPOSURE1, OUTPUT, TTL | 24 | → | TRIGGER IN | 11 |




**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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