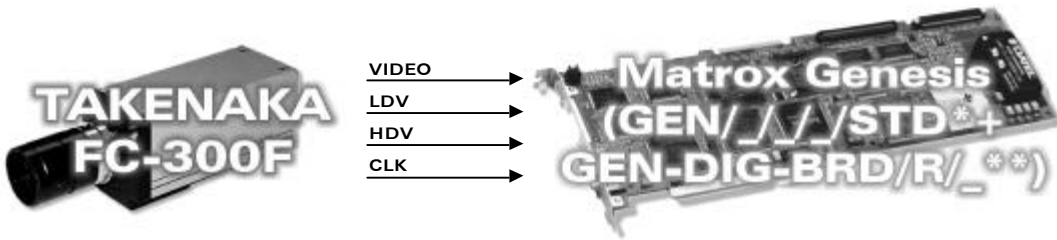
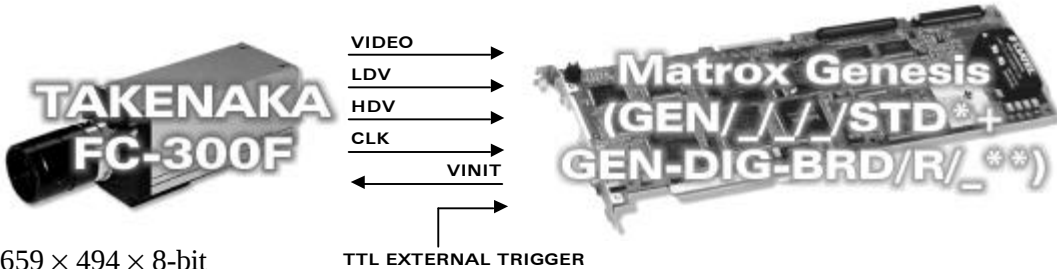


# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

**TAKENAKA FC-300F**

**March 28, 2000**

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Camera Descriptions</b>     | <ul style="list-style-type: none"> <li>• <math>659 \times 494 \times 8</math>-bit @ 30 fps</li> <li>• Single tap analog or RS-422 digital video output.</li> <li>• Progressive scan</li> <li>• External sync.</li> <li>• Internal or external exposure control.</li> <li>• Pixel clock: 24.550 MHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Interface modes</b>         | <ul style="list-style-type: none"> <li>• Continuous, asynchronous reset</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Camera Interface Briefs</b> | <p><b>Mode 1: Continuous</b></p>  <ul style="list-style-type: none"> <li>• <math>659 \times 494 \times 8</math>-bit @ 30 fps</li> <li>• Single tap RS-422 digital video output.</li> <li>• Progressive scan</li> <li>• Continuous video.</li> <li>• Matrox Genesis receiving HSYNC (LDV), VSYNC (FDV), PIXEL CLOCK (CLK @ 24.550 MHz) and video signal from camera.</li> <li>• DCF used: <a href="#">GFC300FC.DCF</a></li> </ul> <p><b>Mode 2: Asynchronous reset</b></p>  <ul style="list-style-type: none"> <li>• <math>659 \times 494 \times 8</math>-bit</li> <li>• Single tap RS-422 digital video output.</li> <li>• Progressive scan</li> <li>• Matrox Genesis receiving TTL external trigger.</li> <li>• Matrox Genesis sending EXPOSURE1 (VINIT) signal to camera; the EXPOSURE1 (VINIT) signal initiate exposure.</li> <li>• Matrox Genesis receiving HSYNC (LDV), VSYNC (FDV), PIXEL CLOCK (CLK @ 24.550 MHz) and video signal from camera.</li> <li>• DCF used: <a href="#">GFC300FA.DCF</a></li> </ul> <p><small>*Matrox Genesis main board with grab module<br/>**Matrox RS-422 digital data input board</small></p> |

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

TAKENAKA FC-300F

March 28, 2000

| <div>Camera Interface Details</div>    | <div>Mode 1: Continuous</div> <div><ul style="list-style-type: none"><li>• <b>Frame rate:</b> Matrox Genesis receives the continuous video from the camera at 30 frames per second.</li><li>• <b>Exposure time:</b> Exposure time is inversely proportionate to the frame rate (no shutter) or determined by the shutter setting. Refer to the camera manual for more information.</li><li>• <b>Camera switch settings:</b> External switch settings are as follows:</li></ul></div> <div><table><tr><th>Switch</th><th>Setting</th></tr><tr><td>Shutter</td><td>0</td></tr><tr><td>Mode</td><td>5</td></tr><tr><td>Up/Down</td><td>UP</td></tr></table></div> <div>Mode 2: Asynchronous Reset</div> <div><ul style="list-style-type: none"><li>• Once it has received the external trigger signal, Matrox Genesis sends the EXPOSURE1 (VINIT) signal to the camera to initiate and control the exposure period.</li><li>• <b>Frame rate:</b> The frame rate is determined by the frequency of the external trigger signal.</li><li>• <b>Exposure time:</b> Exposure time is dependent on the shutter switch setting as well as the width of the EXPOSURE1 (VINIT) signal (active and inactive periods). The default exposure time for this DCF is equal to <b>200 ms</b>. In order to change the width and deployment time of EXPOSURE1 (VINIT) use the Exposure Settings menu tab in Matrox Intellicam. Consult the Matrox Intellicam User Guide for more information.</li><li>• <b>Camera switch settings:</b> External switch settings are as follows:</li></ul></div> <div><table><tr><th>Switch</th><th>Setting</th></tr><tr><td>Shutter</td><td>0</td></tr><tr><td>Mode</td><td>5</td></tr><tr><td>Up/Down</td><td>DOWN</td></tr></table></div> | Switch                                 | Setting                                | Shutter | 0                                      | Mode | 5        | Up/Down | UP | Switch   | Setting | Shutter | 0  | Mode | 5               | Up/Down | DOWN  |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|---------|----------------------------------------|------|----------|---------|----|----------|---------|---------|----|------|-----------------|---------|-------|----|---|-----------------|----|-------|----|---|-----------------|----|-------|----|---|-----------------|----|-------|----|---|-----------------|----|-------|----|---|-----------------|----|-------|----|---|-----------------|----|-------|----|---|-----------------|----|
| Switch                                 | Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Shutter                                | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Mode                                   | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Up/Down                                | UP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Switch                                 | Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Shutter                                | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Mode                                   | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Up/Down                                | DOWN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                        |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| <div>Cabling Requirements</div>        | <div>Mode 1: Continuous</div> <div><ul style="list-style-type: none"><li>• DBHD100-TO-OPEN cable and GEN/DIG/BRD/R/_ board required for digital data, synchronization and control signals.</li><li>• Connections between the 36-pin connector (<b>D-SUB</b>) of the camera and the 100-pin connector of the Matrox Genesis are as follows:</li></ul></div> <div><table><tr><th colspan="2">TAKENAKA FC-300F<br/>(36-pin connector)</th><th></th><th colspan="2">GEN-DIG-BRD/R/_<br/>(100-pin connector)</th></tr><tr><th>Pin name</th><th>Pin no.</th><th></th><th>Pin name</th><th>Pin no.</th></tr><tr><td>DO 0+</td><td>15</td><td>→</td><td>DATA, INPUT, 0+</td><td>01</td></tr><tr><td>DO 0-</td><td>16</td><td>→</td><td>DATA, INPUT, 0-</td><td>02</td></tr><tr><td>DO 1+</td><td>17</td><td>→</td><td>DATA, INPUT, 1+</td><td>03</td></tr><tr><td>DO 1-</td><td>18</td><td>→</td><td>DATA, INPUT, 1-</td><td>04</td></tr><tr><td>DO 2+</td><td>19</td><td>→</td><td>DATA, INPUT, 2+</td><td>05</td></tr><tr><td>DO 2-</td><td>20</td><td>→</td><td>DATA, INPUT, 2-</td><td>06</td></tr><tr><td>DO 3+</td><td>21</td><td>→</td><td>DATA, INPUT, 3+</td><td>07</td></tr><tr><td>DO 3-</td><td>22</td><td>→</td><td>DATA, INPUT, 3-</td><td>08</td></tr></table></div> <div>continued</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TAKENAKA FC-300F<br>(36-pin connector) |                                        |         | GEN-DIG-BRD/R/_<br>(100-pin connector) |      | Pin name | Pin no. |    | Pin name | Pin no. | DO 0+   | 15 | →    | DATA, INPUT, 0+ | 01      | DO 0- | 16 | → | DATA, INPUT, 0- | 02 | DO 1+ | 17 | → | DATA, INPUT, 1+ | 03 | DO 1- | 18 | → | DATA, INPUT, 1- | 04 | DO 2+ | 19 | → | DATA, INPUT, 2+ | 05 | DO 2- | 20 | → | DATA, INPUT, 2- | 06 | DO 3+ | 21 | → | DATA, INPUT, 3+ | 07 | DO 3- | 22 | → | DATA, INPUT, 3- | 08 |
| TAKENAKA FC-300F<br>(36-pin connector) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        | GEN-DIG-BRD/R/_<br>(100-pin connector) |         |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| Pin name                               | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                        | Pin name                               | Pin no. |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 0+                                  | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 0+                        | 01      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 0-                                  | 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 0-                        | 02      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 1+                                  | 17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 1+                        | 03      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 1-                                  | 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 1-                        | 04      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 2+                                  | 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 2+                        | 05      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 2-                                  | 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 2-                        | 06      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 3+                                  | 21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 3+                        | 07      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |
| DO 3-                                  | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | →                                      | DATA, INPUT, 3-                        | 08      |                                        |      |          |         |    |          |         |         |    |      |                 |         |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |       |    |   |                 |    |

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

M A T R O X  
G E N E S I S

TAKENAKA FC-300F

March 28, 2000

| Cabling Requirements | TAKENAKA FC-300F<br>(36-pin connector)                                                                                                                                                                                                                                                                                                    |         | GEN-DIG-BRD/R/_<br>(100-pin connector) |         |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------|---------|
|                      | Pin name                                                                                                                                                                                                                                                                                                                                  | Pin no. | Pin name                               | Pin no. |
|                      | DO 4+                                                                                                                                                                                                                                                                                                                                     | 23      | → DATA, INPUT, 4+                      | 09      |
|                      | DO 4-                                                                                                                                                                                                                                                                                                                                     | 24      | → DATA, INPUT, 4-                      | 10      |
|                      | DO 5+                                                                                                                                                                                                                                                                                                                                     | 25      | → DATA, INPUT, 5+                      | 11      |
|                      | DO 5-                                                                                                                                                                                                                                                                                                                                     | 26      | → DATA, INPUT, 5-                      | 12      |
|                      | DO 6+                                                                                                                                                                                                                                                                                                                                     | 27      | → DATA, INPUT, 6+                      | 13      |
|                      | DO 6-                                                                                                                                                                                                                                                                                                                                     | 28      | → DATA, INPUT, 6-                      | 14      |
|                      | DO 7+                                                                                                                                                                                                                                                                                                                                     | 29      | → DATA, INPUT, 7+                      | 15      |
|                      | DO 7-                                                                                                                                                                                                                                                                                                                                     | 30      | → DATA, INPUT, 7-                      | 16      |
|                      | DO 8+                                                                                                                                                                                                                                                                                                                                     | 31      | → DATA, INPUT, 8+                      | 17      |
|                      | DO 8-                                                                                                                                                                                                                                                                                                                                     | 32      | → DATA, INPUT, 8-                      | 18      |
|                      | DO 9+                                                                                                                                                                                                                                                                                                                                     | 33      | → DATA, INPUT, 9+                      | 19      |
|                      | DO 9-                                                                                                                                                                                                                                                                                                                                     | 34      | → DATA, INPUT, 9-                      | 20      |
|                      | LDV+                                                                                                                                                                                                                                                                                                                                      | 03      | → HSYNC, INPUT, +                      | 33      |
|                      | LDV-                                                                                                                                                                                                                                                                                                                                      | 04      | → HSYNC, INPUT, -                      | 34      |
|                      | FDV+                                                                                                                                                                                                                                                                                                                                      | 05      | → VSYNC, INPUT, +                      | 35      |
|                      | FDV-                                                                                                                                                                                                                                                                                                                                      | 06      | → VSYNC, INPUT, -                      | 36      |
|                      | CLK+                                                                                                                                                                                                                                                                                                                                      | 01      | → CLOCK, INPUT, +                      | 39      |
|                      | CLK-                                                                                                                                                                                                                                                                                                                                      | 02      | → CLOCK, INPUT, -                      | 40      |
|                      | VINIT                                                                                                                                                                                                                                                                                                                                     | 14      | ← EXPOSURE1, OUTPUT, TTL               | 87*     |
|                      | * This connection not required for this mode, however allows this cable to be used with all modes.                                                                                                                                                                                                                                        |         |                                        |         |
|                      | <b>Mode 2: Asynchronous Reset</b>                                                                                                                                                                                                                                                                                                         |         |                                        |         |
|                      | <ul style="list-style-type: none"><li>• DBHD100-TO-OPEN cable and GEN/DIG/BRD/R/_ board required for digital data, synchronization and control signals.</li><li>• All connections between the 36-pin connector (<b>D-SUB</b>) of the camera and the 100-pin connector of the Matrox Genesis are as in <i>Mode 1: Continuous</i></li></ul> |         |                                        |         |

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 Matrox Imaging Applications at 514-822-6061 for assistance.

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