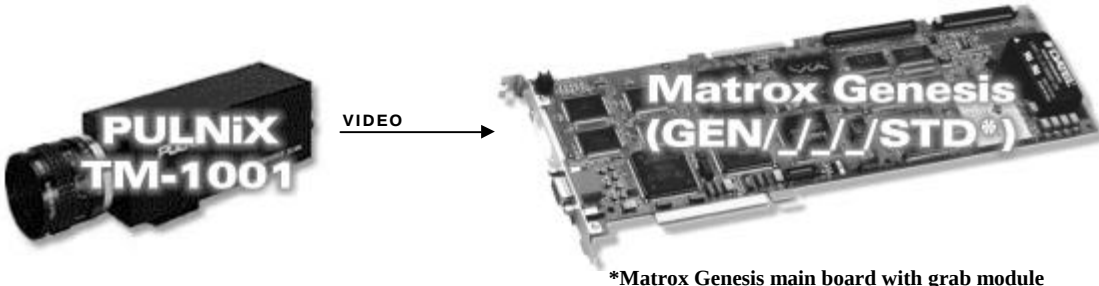
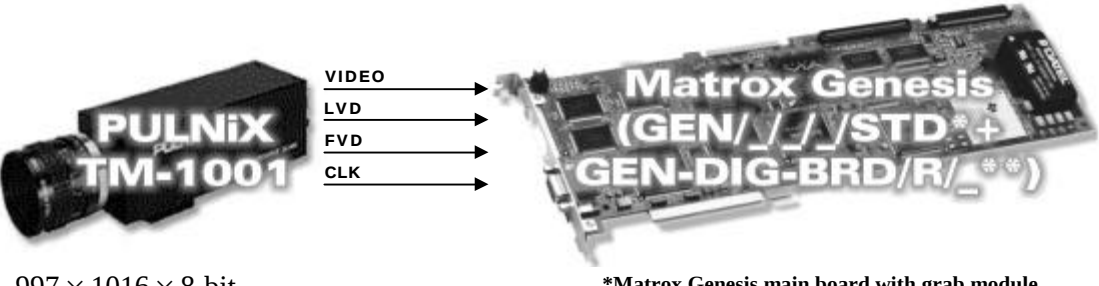


# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

**PULNIX TM-1001**

**February 9, 2001**

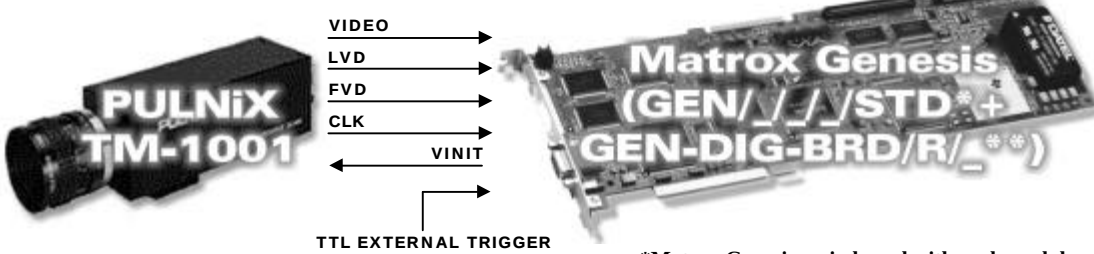
|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Camera Descriptions</b>     | <ul style="list-style-type: none"> <li>• 1024 × 1024 × 8-bit @ 15fps.</li> <li>• Single channel RS-422 digital or analog video output.</li> <li>• Progressive scan.</li> <li>• Internal or external exposure control.</li> <li>• Pixel clock rate: 20 MHz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Interface modes</b>         | <ul style="list-style-type: none"> <li>• Continuous, asynchronous reset (pulse width control mode)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Camera Interface Briefs</b> | <p><b>Mode 1: Continuous (analog)</b></p>  <p>*Matrox Genesis main board with grab module</p> <ul style="list-style-type: none"> <li>• 1008 × 1018 × 8-bit @ 15fps.</li> <li>• Single channel analog video.</li> <li>• Progressive scan.</li> <li>• Continuous video.</li> <li>• Matrox Genesis receiving video signals from camera.</li> <li>• DCF used: <a href="#">TM1001N.DCF</a></li> </ul> <p><b>Mode 2: Continuous (digital)</b></p>  <p>*Matrox Genesis main board with grab module<br/>** Matrox RS-422 digital data input board</p> <ul style="list-style-type: none"> <li>• 997 × 1016 × 8-bit.</li> <li>• Single channel RS-422 digital video.</li> <li>• Progressive scan.</li> <li>• Continuous video.</li> <li>• Matrox Genesis receiving HSYNC (LDV), VSYNC (FDV), PIXEL CLOCK (CLK @ 20 MHz) and video signals from camera.</li> <li>• DCF used: <a href="#">TM1001C.DCF</a></li> </ul> |

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

PULNIX TM-1001

February 9, 2001

| <p>Camera Interface Briefs (continued)</p> | <p><b>Mode 3: Asynchronous Reset (Pulse Width Control Mode)</b></p>  <p>*Matrox Genesis main board with grab module<br/> ** Matrox RS-422 digital data input board</p> <ul style="list-style-type: none"> <li>• 997 × 1016 × 8-bit.</li> <li>• Single channel RS-422 digital video.</li> <li>• Progressive scan</li> <li>• Matrox Genesis receiving TTL external trigger signal.</li> <li>• Matrox Genesis sending EXPOSURE2 (VINIT) signal to camera: the EXPOSURE2 signal both initiates exposure and controls exposure time.</li> <li>• Matrox Genesis receiving HSYNC (LDV), VSYNC (FDV), PIXEL CLOCK (CLK @ 20 MHz), and video signals from camera.</li> <li>• DCF used: TM1001A.DCF</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |          |                 |              |           |     |           |     |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|-----------------|--------------|-----------|-----|-----------|-----|
| <p>Camera Interface Details</p>            | <p><b>Modes 1 and 2: Continuous (analog, digital)</b></p> <ul style="list-style-type: none"> <li>• <b>Frame rate:</b> Matrox Genesis receives the continuous video from the camera at 15 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> Refer to the camera manual for additional information. Switches for this mode should be set as follows:</li> </ul> <p>Modes 1 and 2: Continuous</p> <table border="1" data-bbox="730 1386 1149 1516"> <thead> <tr> <th>Switches</th><th>Settings</th></tr> </thead> <tbody> <tr> <td>Shutter (Speed)</td><td>Any except 9</td></tr> <tr> <td>NRM / ASY</td><td>NRM</td></tr> <tr> <td>DSP / NSP</td><td>NSP</td></tr> </tbody> </table> <p><b>Mode 3: Asynchronous Reset (Pulse Width Control Mode)</b></p> <ul style="list-style-type: none"> <li>• Once it has received the external trigger signal, Matrox Genesis sends the EXPOSURE2 (VINIT) signal to the camera with a width equal to the desired exposure.</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> The active and inactive periods of the EXPOSURE2 (VINIT) signal is the exposure time. The default exposure time for this DCF is equal to <b>31.93 ms</b>. In order to change the width and deployment time of EXPOSURE2 (VINIT) use the Exposure Settings menu tab in Matrox Intellicam. Consult the Matrox Intellicam User Guide for more information.</li> </ul> | Switches | Settings | Shutter (Speed) | Any except 9 | NRM / ASY | NRM | DSP / NSP | NSP |
| Switches                                   | Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |          |                 |              |           |     |           |     |
| Shutter (Speed)                            | Any except 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |                 |              |           |     |           |     |
| NRM / ASY                                  | NRM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |          |                 |              |           |     |           |     |
| DSP / NSP                                  | NSP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |          |                 |              |           |     |           |     |

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

PULNIX TM-1001

February 9, 2001

| <b>Camera Interface Details (continued)</b> | <ul style="list-style-type: none"><li>• <b>Camera switch settings:</b> Refer to the camera manual for additional information. Switches for this mode should be set as follows:<div>Mode 3: Asynchronous Reset<table><tr><th>Switches</th><th>Settings</th></tr><tr><td>Shutter (Speed)</td><td>9</td></tr><tr><td>NRM / ASY</td><td>ASY</td></tr><tr><td>DSP / NSP</td><td>NSP</td></tr></table></div></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Switches                               | Settings                             | Shutter (Speed) | 9                                    | NRM / ASY | ASY      | DSP / NSP | NSP |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------|-----------------|--------------------------------------|-----------|----------|-----------|-----|----------|---------|-----------------|----|---|------|----|-----------------|----|---|------|----|-----------------|----|---|------|----|-----------------|----|---|------|----|-----------------|----|---|------|----|-----------------|----|---|------|----|--------|----|--|-----|----|--------|----|--|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|-----------------|----|---|-----|----|
| Switches                                    | Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                      |                 |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| Shutter (Speed)                             | 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                        |                                      |                 |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| NRM / ASY                                   | ASY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                      |                 |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DSP / NSP                                   | NSP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                        |                                      |                 |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| <b>Cabling Requirements</b>                 | <p><b>Mode 1: Continuous (analog)</b></p> <ul style="list-style-type: none"><li>• IMG-7W2-TO-5BNC cable required for video output of camera.</li><li>• Video input BNC of IMG-7W2-TO-5BNC cable should be connected to VIDEO OUT BNC connector of camera.</li></ul> <p><b>Mode 2: Continuous (digital)</b></p> <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 31-pin connector of the camera and the 100-pin connector of the GEN-DIG-BRD/R/_ are as follows:<table><tr><th colspan="2">GEN-DIG-BRD/R/_<br/>(100-pin connector)</th><th></th><th colspan="2">PULNiX TM-1001<br/>(31-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>CLOCK, INPUT, +</td><td>39</td><td>←</td><td>CLK+</td><td>01</td></tr><tr><td>CLOCK, INPUT, -</td><td>40</td><td>←</td><td>CLK-</td><td>17</td></tr><tr><td>HSYNC, INPUT, +</td><td>33</td><td>←</td><td>LVD+</td><td>02</td></tr><tr><td>HSYNC, INPUT, -</td><td>34</td><td>←</td><td>LVD-</td><td>18</td></tr><tr><td>VSYNC, INPUT, +</td><td>35</td><td>←</td><td>FVD+</td><td>03</td></tr><tr><td>VSYNC, INPUT, -</td><td>36</td><td>←</td><td>FVD-</td><td>19</td></tr><tr><td>GROUND</td><td>50</td><td></td><td>GND</td><td>04</td></tr><tr><td>GROUND</td><td>37</td><td></td><td>GND</td><td>16</td></tr><tr><td>DATA, INPUT, 0+</td><td>01</td><td>←</td><td>D0+</td><td>08</td></tr><tr><td>DATA, INPUT, 0-</td><td>02</td><td>←</td><td>D0-</td><td>24</td></tr><tr><td>DATA, INPUT, 1+</td><td>03</td><td>←</td><td>D1+</td><td>09</td></tr><tr><td>DATA, INPUT, 1-</td><td>04</td><td>←</td><td>D1-</td><td>25</td></tr><tr><td>DATA, INPUT, 2+</td><td>05</td><td>←</td><td>D2+</td><td>10</td></tr><tr><td>DATA, INPUT, 2-</td><td>06</td><td>←</td><td>D2-</td><td>26</td></tr><tr><td>DATA, INPUT, 3+</td><td>07</td><td>←</td><td>D3+</td><td>11</td></tr><tr><td>DATA, INPUT, 3-</td><td>08</td><td>←</td><td>D3-</td><td>27</td></tr><tr><td>DATA, INPUT, 4+</td><td>09</td><td>←</td><td>D4+</td><td>12</td></tr><tr><td>DATA, INPUT, 4-</td><td>10</td><td>←</td><td>D4-</td><td>28</td></tr></table></li></ul> <p>continued</p> | GEN-DIG-BRD/R/_<br>(100-pin connector) |                                      |                 | PULNiX TM-1001<br>(31-pin connector) |           | Pin name | Pin no.   |     | Pin name | Pin no. | CLOCK, INPUT, + | 39 | ← | CLK+ | 01 | CLOCK, INPUT, - | 40 | ← | CLK- | 17 | HSYNC, INPUT, + | 33 | ← | LVD+ | 02 | HSYNC, INPUT, - | 34 | ← | LVD- | 18 | VSYNC, INPUT, + | 35 | ← | FVD+ | 03 | VSYNC, INPUT, - | 36 | ← | FVD- | 19 | GROUND | 50 |  | GND | 04 | GROUND | 37 |  | GND | 16 | DATA, INPUT, 0+ | 01 | ← | D0+ | 08 | DATA, INPUT, 0- | 02 | ← | D0- | 24 | DATA, INPUT, 1+ | 03 | ← | D1+ | 09 | DATA, INPUT, 1- | 04 | ← | D1- | 25 | DATA, INPUT, 2+ | 05 | ← | D2+ | 10 | DATA, INPUT, 2- | 06 | ← | D2- | 26 | DATA, INPUT, 3+ | 07 | ← | D3+ | 11 | DATA, INPUT, 3- | 08 | ← | D3- | 27 | DATA, INPUT, 4+ | 09 | ← | D4+ | 12 | DATA, INPUT, 4- | 10 | ← | D4- | 28 |
| GEN-DIG-BRD/R/_<br>(100-pin connector)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                        | PULNiX TM-1001<br>(31-pin connector) |                 |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| Pin name                                    | Pin no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                        | Pin name                             | Pin no.         |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| CLOCK, INPUT, +                             | 39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | CLK+                                 | 01              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| CLOCK, INPUT, -                             | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | CLK-                                 | 17              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| HSYNC, INPUT, +                             | 33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | LVD+                                 | 02              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| HSYNC, INPUT, -                             | 34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | LVD-                                 | 18              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| VSYNC, INPUT, +                             | 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | FVD+                                 | 03              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| VSYNC, INPUT, -                             | 36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | FVD-                                 | 19              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| GROUND                                      | 50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        | GND                                  | 04              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| GROUND                                      | 37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                        | GND                                  | 16              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 0+                             | 01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D0+                                  | 08              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 0-                             | 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D0-                                  | 24              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 1+                             | 03                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D1+                                  | 09              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 1-                             | 04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D1-                                  | 25              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 2+                             | 05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D2+                                  | 10              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 2-                             | 06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D2-                                  | 26              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 3+                             | 07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D3+                                  | 11              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 3-                             | 08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D3-                                  | 27              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 4+                             | 09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D4+                                  | 12              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |
| DATA, INPUT, 4-                             | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ←                                      | D4-                                  | 28              |                                      |           |          |           |     |          |         |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |                 |    |   |      |    |        |    |  |     |    |        |    |  |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |                 |    |   |     |    |

# Application Note:

## Interfacing non-standard cameras to Matrox Genesis

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

PULNIX TM-1001

February 9, 2001

### Cabling Requirements (continued)

| GEN-DIG-BRD/R/_<br>(100-pin connector) |         | PULNiX TM-1001<br>(31-pin connector) |         |
|----------------------------------------|---------|--------------------------------------|---------|
| Pin name                               | Pin no. | Pin name                             | Pin no. |
| DATA, INPUT, 5+                        | 11      | D5+                                  | 13      |
| DATA, INPUT, 5-                        | 12      | D5-                                  | 29      |
| DATA, INPUT, 6+                        | 13      | D6+                                  | 14      |
| DATA, INPUT, 6-                        | 14      | D6-                                  | 30      |
| DATA, INPUT, 7+                        | 15      | D7+                                  | 15      |
| DATA, INPUT, 7-                        | 16      | D7-                                  | 31      |
| EXPOSURE2, OUTPUT, TTL                 | 88*     | VINIT                                | 20*     |

\* This connection is not required for this mode, however allows this cable to be used with both digital modes.

### Mode 3: Asynchronous Reset (Pulse Width Control Mode)

- DBHD100-TO-OPEN cable and GEN/DIG/BRD/R/\_ board required for digital data, synchronization and control signals.
- The connections between the 100-pin connector of the GEN-DIG-BRD/R/\_ and the 31-pin connector of the camera are as in Mode 2: *Continuous mode (digital)* with the exception of the following additional connection:

| GEN-DIG-BRD/R/_<br>(100-pin connector) |         | PULNiX TM-1001<br>(31-pin DC connector) |         |
|----------------------------------------|---------|-----------------------------------------|---------|
| Pin name                               | Pin no. | Pin name                                | Pin no. |
| EXPOSURE2, OUTPUT, TTL                 | 88      | VINIT                                   | 20      |

- TTL external trigger source should be connected to the TTL Trigger Input of the IMG-7W2-TO-5BNC cable.
- To use an RS-422 external trigger input, modify the DCF using Matrox Intellicam (refer to the Matrox Intellicam User Guide for more information), and add the following connections between the 100-pin connector of the GEN-DIG-BRD/R/\_ and the external trigger source:

| GEN-DIG-BRD/R/_<br>(100-pin connector) |         | External trigger source |  |
|----------------------------------------|---------|-------------------------|--|
| Pin name                               | Pin no. | Pin name                |  |
| TRIGGER, INPUT, +                      | 47      | "RS-422 TRIGGER+"       |  |
| TRIGGER, INPUT, -                      | 48      | "RS-422 TRIGGER-"       |  |

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: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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