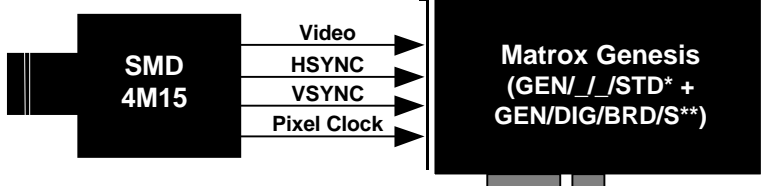
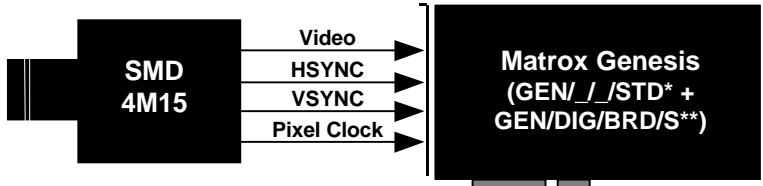


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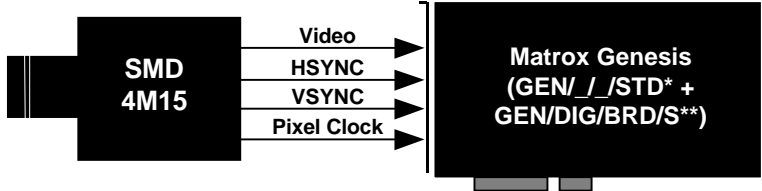
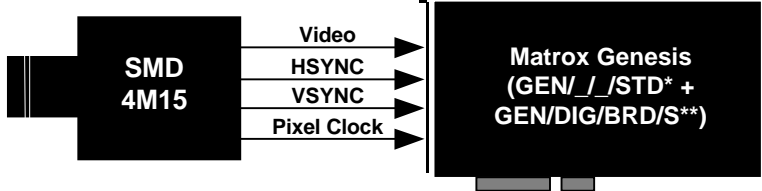
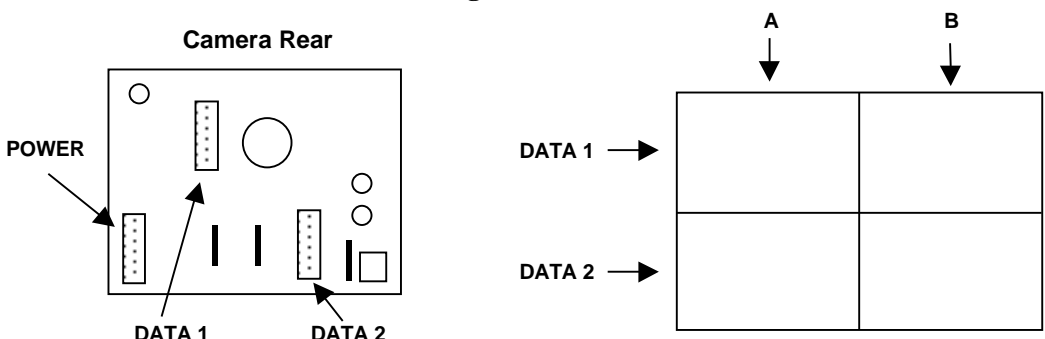
<b>Camera Descriptions</b>	<ul style="list-style-type: none"> <li>• 2048 x 2048 x 12-bit @ 15 fps.</li> <li>• 4-channel digital video output (RS-422).</li> <li>• Non-interlaced (progressive scan).</li> <li>• Internal syncs.</li> <li>• Internal exposure control.</li> <li>• Maximum data rate per output: 15 MB/s</li> </ul> <p><b>N.B. This camera outputs 12-bit however only 8-bit was used for this interface</b></p>
<b>Interface mode</b>	<ul style="list-style-type: none"> <li>• Continuous (no Binning, 2x2 Binning, 4x4 Binning, AOI)</li> </ul>
<b>Camera Interface Briefs</b>	<p><b>Mode 1: Continuous (no Binning)</b></p>  <p>* Matrox Genesis Main Board with Grab Module  ** Matrox Digital Data Input Board</p> <ul style="list-style-type: none"> <li>• 2048 x 2048 x 8-bit @ 15 fps.</li> <li>• 4-channel digital video output (RS-422).</li> <li>• Non-interlaced (progressive scan).</li> <li>• Continuous video.</li> <li>• Pixel clock frequency: 20 MHz</li> <li>• Matrox Genesis receiving RS-422 HSYNC, VSYNC and pixel clock signals from camera.</li> <li>• DCF used : <a href="#">SMDC1X1.DCF</a></li> <li>• <b>Note: requires two additional programs for operation (see Camera Interface Details)</b></li> </ul> <p><b>Mode 2: Continuous (2x2 Binning)</b></p>  <p>* Matrox Genesis Main Board with Grab Module  ** Matrox Digital Data Input Board</p> <ul style="list-style-type: none"> <li>• 1024 x 1024 x 8-bit @ 28 fps.</li> <li>• 4-channel digital video output (RS-422).</li> <li>• Non-interlaced (progressive scan).</li> <li>• Continuous video.</li> <li>• Pixel clock frequency: 10 MHz</li> <li>• Matrox Genesis receiving RS-422 HSYNC, VSYNC and pixel clock signals from camera.</li> <li>• DCF used : <a href="#">SMDC2X2.DCF</a></li> <li>• <b>Note: requires two additional programs for operation (see Camera Interface Details)</b></li> </ul>

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<p><b>Camera Interface Briefs (continued)</b></p>	<p><b>Mode 3: Continuous (4x4 Binning)</b></p>  <ul style="list-style-type: none"> <li>• 512 x 512 x 8-bit @ 46 fps.</li> <li>• 4-channel digital video output (RS-422).</li> <li>• Non-interlaced (progressive scan).</li> <li>• Continuous video.</li> <li>• Pixel clock frequency: 5 MHz</li> <li>• Matrox Genesis receiving RS-422 HSYNC, VSYNC and pixel clock signals from camera.</li> <li>• DCF used : <a href="#">SMDC4X4.DCF</a></li> <li>• <b>Note: requires two additional programs for operation (see Camera Interface Details)</b></li> </ul> <p><b>Mode 4: Continuous (AOI -Area Of Interest)</b></p>  <ul style="list-style-type: none"> <li>• 1024 x 256 x 8-bit @ ≈ 15 fps.</li> <li>• 4-channel digital video output (RS-422).</li> <li>• Interlaced.</li> <li>• Continuous video.</li> <li>• Pixel clock frequency: 10 MHz</li> <li>• Matrox Genesis receiving RS-422 HSYNC, VSYNC and pixel clock signals from camera.</li> <li>• DCF used : <a href="#">SMDCAOI.DCF</a></li> <li>• <b>Note: requires two additional programs for operation (see Camera Interface Details)</b></li> </ul>
<p><b>Camera Interface Details</b></p>	<p><b>Modes 1-4: Data connections and image viewed from front</b></p> 

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<b>Camera Interface Details (continued)</b>	<p><b>Modes 1-4: Continuous (no Binning, 2x2 Binning, 4x4 Binning, AOI)</b></p> <ul style="list-style-type: none"> <li>• In addition to the corresponding DCF file, two supplementary programs are required to operate the camera with the Matrox Genesis: <b>comserial.c</b> (to write data to the PC serial port) and <b>grabsmc.c</b> (to control the Matrox Genesis grabbing).</li> <li>• Programming the serial port requires the following usage: "comserial -x addr data" (hexadecimal values) or "comserial -d addr data" (decimal values)</li> <li>• Operating Modes: Address 0x81 of the camera controls the principle operating modes. <ul style="list-style-type: none"> <li>No Binning : comserial -x 81 02</li> <li>2x2 Binning: comserial -x 81 06</li> <li>4x4 Binning: comserial -x 81 0a</li> <li>AOI mode : comserial -x 81 42</li> </ul> </li> </ul> <p><b>Mode 4: Continuous (AOI -Area Of Interest)</b></p> <ul style="list-style-type: none"> <li>• <b>Start/End registers</b>  Addresses 0x89 and 0x8a control the START readout register. Addresses 0x8c and 0x8b control the END readout register. The commands below indicate that the readout will start at line 0x30f (783) and end at 0x410 (1040) for a total of 256 lines read out (per tap). <ul style="list-style-type: none"> <li>comserial -x 8a 0f</li> <li>comserial -x 89 03</li> <li>comserial -x 8c 10</li> <li>comserial -x 8b 04</li> </ul> </li> <li>• For more information and options refer to the readme.txt file included with the DCFs and demo program or contact Matrox Imaging Applications at 514-822-6061 for assistance.</li> </ul>
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<b>Cabling Requirements</b>	<b>Modes 1-4: Continuous (no Binning, 2x2 Binning, 4x4 Binning, AOI)</b>			
	<ul style="list-style-type: none"> <li>• GEN-DIG-BRD/S required for digital data, syncs and control signals in RS-422 format.</li> <li>• The connections between the 15-pin quad connector (DATA1) of the camera and the 100-pin connector of the GEN-DIG-BRD/S are as follows:</li> </ul>			
	<b>SMD 4M15 (DATA1 15-pin quad-row connector)</b>		<b>GEN-DIG-BRD/S (GEN/CBL/OPEN connector)</b>	
	<i>Pin name</i>	<i>Pin no.</i>	<i>Pin name</i>	<i>Pin no.</i>
	D1A4+	09 →	DATA, INPUT, 0+	01
	D1A4-	10 →	DATA, INPUT, 0-	02
	D1A5+	11 →	DATA, INPUT, 1+	03
	D1A5-	12 →	DATA, INPUT, 1-	04
	D1A6+	13 →	DATA, INPUT, 2+	05
	D1A6-	14 →	DATA, INPUT, 2-	06
	D1A7+	17 →	DATA, INPUT, 3+	07
	D1A7-	18 →	DATA, INPUT, 3-	08
	D1A8+	19 →	DATA, INPUT, 4+	09
	D1A8-	20 →	DATA, INPUT, 4-	10
	D1A9+	21 →	DATA, INPUT, 5+	11
	D1A9-	22 →	DATA, INPUT, 5-	12
	D1A10+	23 →	DATA, INPUT, 6+	13
	D1A10-	24 →	DATA, INPUT, 6-	14
	D1A11+	25 →	DATA, INPUT, 7+	15
	D1A11-	26 →	DATA, INPUT, 7-	16
	D1B4+	40 →	DATA, INPUT, 8+	17
	D1B4-	39 →	DATA, INPUT, 8-	18
	D1B5+	38 →	DATA, INPUT, 9+	19
	D1B5-	37 →	DATA, INPUT, 9-	20
	D1B6+	36 →	DATA, INPUT, 10+	21
	D1B6-	35 →	DATA, INPUT, 10-	22
	D1B7+	34 →	DATA, INPUT, 11+	23
	D1B7-	33 →	DATA, INPUT, 11-	24
	D1B8+	32 →	DATA, INPUT, 12+	25
	D1B8-	31 →	DATA, INPUT, 12-	26
	D1B9+	52 →	DATA, INPUT, 13+	27
	D1B9-	51 →	DATA, INPUT, 13-	28
	D1B10+	50 →	DATA, INPUT, 14+	29
	D1B10-	49 →	DATA, INPUT, 14-	30
	D1B11+	48 →	DATA, INPUT, 15+	31
	D1B11-	47 →	DATA, INPUT, 15-	32
	D1HSYNC+	58 →	HSYNC, INPUT, +	33
	D1HSYNC -	57 →	HSYNC, INPUT, -	34
	D1VSYNC+	56 →	VSYNC, INPUT, +	35
	D1VSYNC -	55 →	VSYNC, INPUT, -	36
	D1GND+	45 →	GROUND	37
	D1GND-	46 →	GROUND	38
	D1PCLK+	60 →	CLOCK, INPUT, +	39
	D1PCLK -	59 →	CLOCK, INPUT, -	40

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<b>Cabling Requirements (continued)</b>	<ul style="list-style-type: none"> <li>The connections between the 15-pin quad-row connector (DATA2) of the camera and the 100-pin connector of the GEN-DIG-BRD/S are as follows:</li> </ul>			
	<b>SMD 4M15</b> <b>(DATA2 15-pin quad-row connector)</b>		<b>GEN-DIG-BRD/S</b> <b>(GEN/CBL/OPEN connector)</b>	
	<i>Pin name</i>	<i>Pin no.</i>	<i>Pin name</i>	<i>Pin no.</i>
	D2A4+	09 →	DATA, INPUT, 16+	51
	D2A4-	10 →	DATA, INPUT, 16-	52
	D2A5+	11 →	DATA, INPUT, 17+	53
	D2A5-	12 →	DATA, INPUT, 17-	54
	D2A6+	13 →	DATA, INPUT, 18+	55
	D2A6-	14 →	DATA, INPUT, 18-	56
	D2A7+	17 →	DATA, INPUT, 19+	57
	D2A7-	18 →	DATA, INPUT, 19-	58
	D2A8+	19 →	DATA, INPUT, 20+	59
	D2A8-	20 →	DATA, INPUT, 20-	60
	D2A9+	21 →	DATA, INPUT, 21+	61
	D2A9-	22 →	DATA, INPUT, 21-	62
	D2A10+	23 →	DATA, INPUT, 22+	63
	D2A10-	24 →	DATA, INPUT, 22-	64
	D2A11+	25 →	DATA, INPUT, 23+	65
	D2A11-	26 →	DATA, INPUT, 23-	66
	D2B4+	40 →	DATA, INPUT, 24+	67
	D2B4-	39 →	DATA, INPUT, 24-	68
	D2B5+	38 →	DATA, INPUT, 25+	69
	D2B5-	37 →	DATA, INPUT, 25-	70
	D2B6+	36 →	DATA, INPUT, 26+	71
	D2B6-	35 →	DATA, INPUT, 26-	72
	D2B7+	34 →	DATA, INPUT, 27+	73
	D2B7-	33 →	DATA, INPUT, 27-	74
	D2B8+	32 →	DATA, INPUT, 28+	75
	D2B8-	31 →	DATA, INPUT, 29-	76
	D2B9+	52 →	DATA, INPUT, 29+	77
	D2B9-	51 →	DATA, INPUT, 30-	78
	D2B10+	50 →	DATA, INPUT, 31+	79
	D2B10-	49 →	DATA, INPUT, 31-	80
	D2B11+	48 →	DATA, INPUT, 32+	81
	D2B11-	47 →	DATA, INPUT, 32-	82

The DCF(s) mentioned in this application note can be found on the MIL and MIL-Lite CD, or our FTP site ([ftp.matrox.com](ftp:matrox.com)). The information furnished by Matrox Electronics System, Ltd. is believed to be accurate and reliable. Please verify all interface connections with camera documentation or manual. Contact Matrox for more information, if necessary.

**Corporate Headquarters:**  
**Canada and U.S.A.**  
**Matrox Electronic Systems Ltd.**  
 1055 St.Regis Blvd.  
 Dorval, Quebec, Canada  
 H9P 2T4  
 Tel: (514) 685-7230  
 Fax: (514) 822-6273

**Sales Offices:**

**U.K.**  
**Matrox (UK) Ltd.**  
 Sefton Park, Stoke Poges  
 Buckinghamshire  
 U.K. SL2 4JS  
 Tel: +44 (0) 1753 665500  
 Fax: +44 (0) 1753 665599

**France**  
**Matrox France SARL**  
 2, rue de la Couture,  
 Sillic 225  
 94528 Rungis Cedex  
 Tel: (0) 1 45-60-62-00  
 Fax: (0) 1 45-60-62-05

**Germany**  
**Matrox GmbH**  
 Inselkammerstr.8  
 D-82008 Unterhaching  
 Germany  
 Tel: 089/614 4740  
 Fax: 089/614 9743

**Asia Pacific**  
**Matrox Asia Liaison Office**  
 Rm. 1901, 19/F, Workington Tower,  
 78 Bonham Strand E.,  
 Sheung Wan, Hong Kong.  
 Tel: 852.2877.5387  
 Fax: 852.2537.9530


**GEN-CID-031**