Display PSMOD
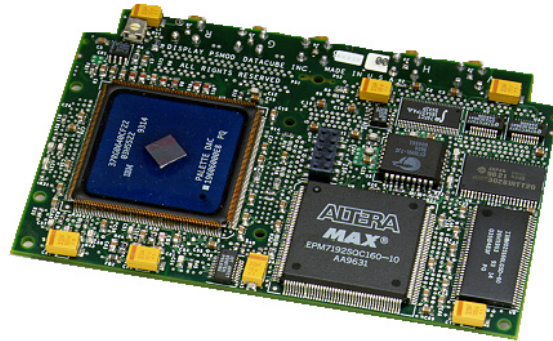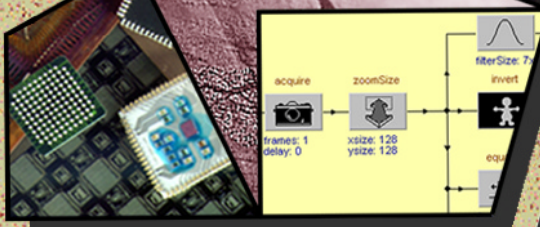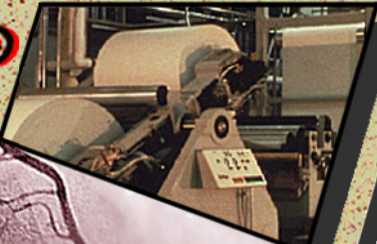## High-Quality, Live-Video Output

- 10-bit RGB DAC for diagnostic quality imaging

- Programmable output supporting a wide variety of resolutions in both landscape and portrait

- Low-cost reduced slot solution when used with a VGA enabled mother board or CPU

- Hardware double buffering to prevent display of artifacts on motion imagery

- Hardware overlay buffer

The Display PSMOD (processing and storage module) provides high-quality, live video output for any motherboard that supports the PSMOD architecture. When used on the MaxPCI image processing board from Datacube, the Display PSMOD provides a high-resolution, high-quality alternative for those who require something more than standard VGA output. The MaxPCI+Display PSMOD configuration may be used in conjunction with third-party VGA cards or a VGA-enabled motherboard or CPU, saving both the expense of additional hardware and valuable PCI slots.

The Display PSMOD features a 10-bit RBG digital to analog converter (DAC) which produces a diagnostic quality display of still and motion imagery (luminance calibrator not included). Hardware double buffering allows real-time video to be displayed at 75 Hz (typical display rate) without interference from the artifacts of temporal up-sampling. Dedicated gamma LUTs make gamma correction unnecessary elsewhere in the system.

The Display PSMOD supports a wide variety of resolutions, including 1280x1024, 1600x1280, portrait 1024x1280, CCIR, and RS-170. The module's resolution is software configurable. (See Specifications included in this data sheet for a complete listing of supported resolutions.)

The connection to the motherboard is provided by a 120-pin high-density connector which carries power, digital data, and digital control signals to and from the Display PSMOD (labeled "PSMOD 0" on MaxPCI, Rev. 2 boards).

Features

- 10-bit DAC
  - Produces high-quality display
  - Three 8- to 10-bit gamma LUTs for display
  - Refresh rate up to 80 Hz
  - Displays up to 1024 shades of gray
  - Capable of 256 color display, or 24-bit full color within certain modes
- Configurable range of display resolutions; software programmable resolutions include but are not limited to:
  - 1600x1280
  - 1280x1024
  - Portrait 1024x1280
  - CCIR
  - RS-170
- Flexible grayscale and pseudocolor support
  - 8-bit or 10-bit grayscale
  - 16-bit high-color
  - 16-bit YUV
  - 24-bit full-color
- Supports both landscape and portrait display configurations
- Unicode support
- Standard PC ImageFlow graphics support
- MAXbus RCV gateway receives images from MaxPCI at up to 160 MB/sec.
- Support for 16-bit foreign fonts

Specifications

Display Resolution
- See table below for a complete list of supported display configurations

DAC Resolution
- Triple 10-bit, 1024-level DAC

Display Depth
- 4, 8, 10, 16, and 24 bits per pixel

Memory
- 2.6 MB of single-buffered image memory
- 1.3 MB of double-buffered image memory
- 1 MB of overlay memory

Bus Interface
- PSMOD architecture (may only be installed at "PSMOD 0" on MaxPCI, Rev. 2 boards)

Monitors
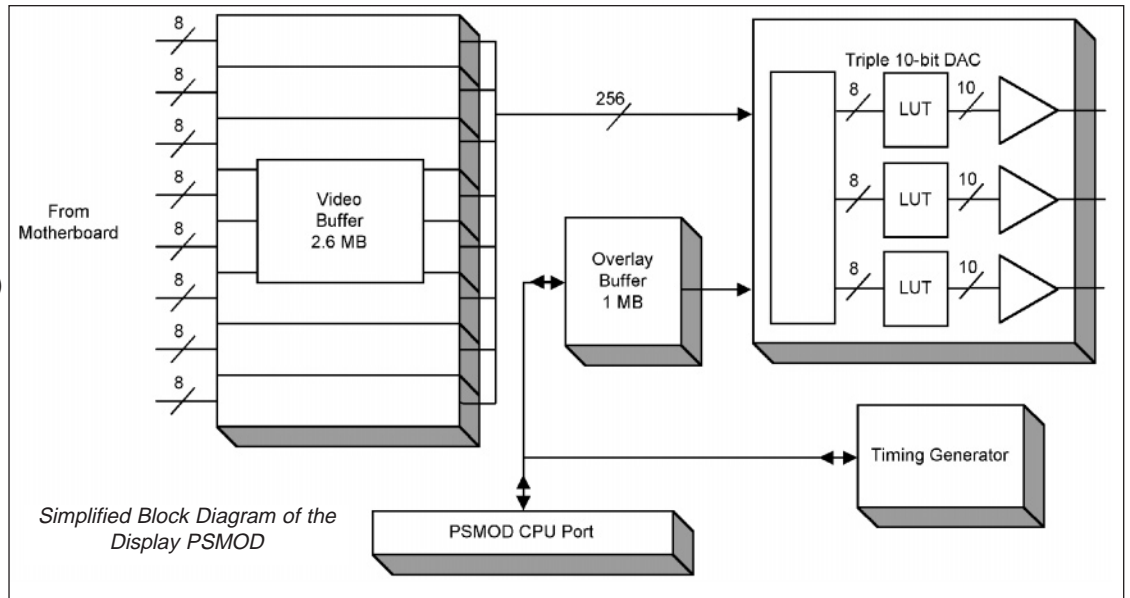- Monochrome or color

Pixel Rate
- Up to 200 MHz

Refresh Rate
- Up to 80 Hz

Video Output Levels
- RS-343 with composite or separate H and V sync

Software
- PC ImageFlow for PCI-based systems
- ImageFlow for VME-based systems

Physical Specifications
- Height: 0.31 inches (8 mm)
- Length: 4.50 inches (114 mm)
- Width: 2.69 inches (68 mm)
- Weight: 1.48 ounces* (42.0 grams*)
  * Weight provided without heatsink

Power Requirements (all voltages are ±5%)
- +3.3 Volts   1.3 A (typical)
- +5.0 Volts   2.0 A (typical)
  14.29 Watts total (typical)

Simplified Block Diagram of the Display PSMOD

Environmental Specifications
- Operating Temperature: 32° to 131° F (0° to 55° C)
- Maximum Chip Case Temp: 85° C (185° F)
- Storage Temperature: -40° to 212° F (-40° to 100° C)
- Relative Humidity: 10% to 90% (non-condensing)
- Air Flow Requirement: 25 LFPM (min)

Additional Information
For related product information, refer to the following Datacube literature:

MaxPCI Data Sheet
DQWiT Data Sheet
PC ImageFlow Data Sheet

Typical 1280x1024 Timing
The following numbers represent typical timing results for one of many display resolutions supported by the Display PSMOD.

Parameter	Value	
Horizontal Raster Extent:	1280	pixels
Horizontal Blanking:	416	pixels
Vertical Raster Extent:	1024	lines
Vertical Blanking:	42	lines
Frame Rate:	72	Hz
Total Pixels (Horizontal):	1696	pixels
Blanking % (Horizontal):	24.5283	%
Frequency (Horizontal):	76.752	KHz
Period (Horizontal):	13.0290	uS
Total Lines (Vert.):	1066	lines
Blanking % (Vert.):	3.9400	%
Frequency (Vert.):	72	Hz
Frame Period (Vert.):	13.8889	mS
Active Pixels:	1,310,720	pixels
Total Pixels (incl. blank):	1,807,936	pixels
Total Active %:	72.4981	%
Total Blanking %:	27.5019	%
Ideal Clock Rate:	130.1714	MHz
Ideal Clock Period:	7.6822	nS

HxV Image Extent	Pixel Rate (MHz)	Max. Live Image Size (KPels)	Image Pixel Depth (Single-buffered)	Overlay Memory Pixel Depth	Interlace	Comments
1024x1024	200	1327	16	4	No	Standard
1600x1280	200	1327	16	4	No	Biggest
1024x1280	200	1327	16	4	No	Portrait
1024x1024	200	1327	16	4	No	Square
1024x768	100	663	24	8	No	24-bit Deep
800x600	100	663	24	8	No	Lower Res.
640x480	100	663	24	8	No	Lower Res.
768x576	14.75	663	24	8	Yes	Square Pixel CCIR
640x484	12.27	663	24	8	Yes	Square Pixel RS-170
512x576	9.84	663	24	8	Yes	Classic-512 CCIR
512x484	9.69	663	24	8	Yes	Classic-512 RS-170