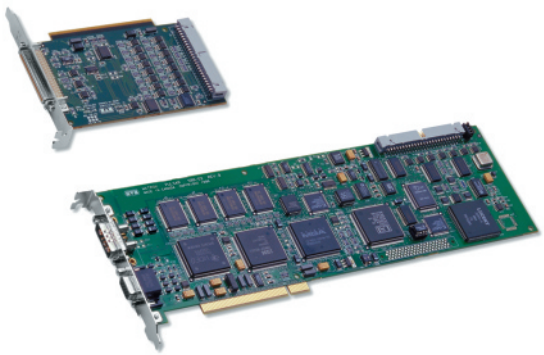
Matrox Pulsar

Flexible monochrome PCI frame grabber with real-time transfer to system memory and integrated display.



Matrox Pulsar

Matrox Pulsar offers all the right features for your standard/non-standard monochrome acquisition needs, as well as provides outstanding onboard display capabilities. Whether you develop machine vision, image analysis, or medical imaging applications, you'll find Matrox Pulsar fits your requirements:

- acquisition and display on one board for a single-slot solution
- triggered acquisition allows interface to cameras with asynchronous reset modes
- high-rate capture meets the demands of high-speed inspection systems
- real-time transfer to host memory provides immediate access of images by the host
- 10-bit digitization enables accurate capture of low-contrast images
- high-resolution capture handles large fields of view with fine detail
- non-destructive overlay gives you the ability to annotate images that are updated in real-time

Software

Software support for Matrox Pulsar includes Matrox Imaging Library (MIL), a comprehensive high-level library that includes ActiveMIL, a collection of ActiveX controls (OCXs) for managing image capture, transfer, processing, analysis, and display.

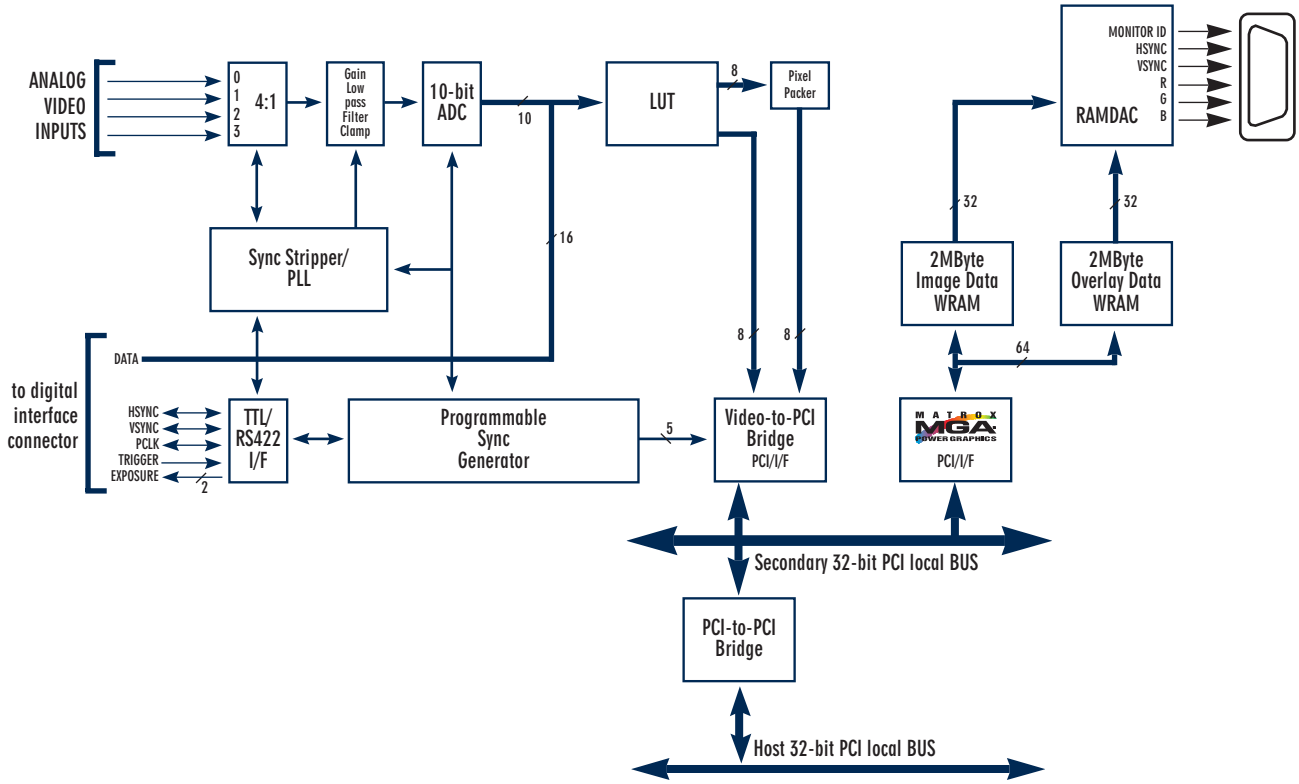
MATROX PULSAR

Key Features:

- full size, single-slot PCI frame grabber with integrated display
- captures from standard/non-standard, monochrome, analog/digital, frame/line[1] scan sources
- 10-bit A/D
- 16-bit wide digital interface
- PCI bus master
- real-time transfer to system or on-board VGA memory
- monochrome display with pseudo-color non-destructive overlay
- display at up to 1600 x 1200
- available software includes Matrox Imaging Library (MIL)/ ActiveMIL, MIL-Lite/ ActiveMIL-Lite, Matrox Intellicam, and Matrox Inspector
- support for Windows NT/98 and DOS4GW 32-bit DOS

MATROX IMAGING

Matrox Pulsar



Acquisition

Standard/non-standard monochrome acquisition

Matrox Pulsar delivers flexible monochrome analog or digital video acquisition and accurately locks to video sources (± 2ns pixel jitter). It grabs from RS-170/CCIR cameras and from non-standard devices such as high resolution frame scan cameras and line scan cameras.[1] It supports capture at up to 1K x 1K x 8 bits per pixel at 30 frames per second or the equivalent.[2]

For applications requiring more than 256 gray levels, Matrox Pulsar has 10-bit analog to digital conversion. Sampling is up to 30 MHz with 10-bit grayscale resolution or up to 45 MHz with 8-bit. Up to 4 analog software-selectable input channels are available for interfacing to multiple cameras. The onboard PLL generates a variable scan clock with a programmable frequency from 5-45 MHz, and provides phase adjustments from -180° to 90° in 90° increments.

For digital acquisition, Matrox Pulsar provides up to 16-bit TTL data input. An optional companion board is available for up to 16-bit RS-422 digital video data input. Digital data can be clocked at up to 30 MHz.

Video adjustment

Software programmable gain allows conditioning of the video input signal so that the complete dynamic range of the 10-bit A/D converter can be used. For more specialized applications requiring a finer adjustment of the video input, black level and reference controls are available on the A/D converter.

The programmable look-up table (LUT) can transform greater than 8-bit pixel data to 8-bit pixels for transfer to the display section or host system. It can also be used to remap an incoming video stream. Matrox Pulsar supports horizontal and vertical sub-sampling by 2 and 4.

Synchronization and control

Matrox Pulsar can be programmed to accept or generate video timing signals such as horizontal sync, vertical sync, and pixel clock in TTL/RS-422 format.

External trigger

An external digital (opto-isolated/TTL/RS-422) trigger input can reset the acquisition hardware synchronously or asynchronously to provide user control over image capture in relation to external events.

Exposure control

Two programmable digital (TLL/RS-422) exposure (or timer) outputs are available to remotely control camera exposure timings and/or trigger strobes.

Transfers

Transfer rate

Matrox Pulsar is capable of sustaining transfer rates of up to 60 MB/sec between the acquisition section and the host PCI system (depending on the host computer used).

PCI bus master

Matrox Pulsar acts as a PCI bus master allowing transfers without requiring continuous host intervention.

Display

High resolutions

Matrox Pulsar's integrated display delivers real-time display of captured video. Various resolutions up to 1600 x 1200 are supported at refresh rates up to 85 Hz.

This display section is powered by award-winning Matrox MGA graphics accelerator technology and can be used as the host system's main display controller, eliminating the need for a separate display board[3]. The display section incorporates the Matrox MGA 2064W chip, a 220 MHz RAMDAC, and dual-ported WRAM, thus guaranteeing lightning-fast display performance, high-resolution, and a high refresh rate.

Dual frame buffer architecture

The integrated display section comes with a 2 MB WRAM image frame buffer (8-bit monochrome) and a separate 2 MB WRAM overlay frame buffer (8-bit pseudo color).

Non-destructive overlay

The overlay frame buffer enables non-destructive overlay of desktop and/or separate text and graphics onto the contents of the image frame buffer.

Dual-screen mode

In this set-up, Matrox Pulsar can capture and display live video with overlay on one monitor while an additional display board (or another Matrox Pulsar) displays the desktop on a second monitor.

Multi-head mode

Under Windows NT, one large virtual desktop can be created and displayed across multiple monitors using, for example, two Matrox Pulsar boards or a Matrox Pulsar and Matrox graphics board. The live video can be displayed across all screens.

Software

Matrox Imaging Library (MIL)

MIL is a high-level programming library with an extensive set of optimized functions for image capture, transfer, processing (point-to-point, statistics, filtering, morphology, geometric transforms, FFT, JPEG codec, and segmentation), pattern matching, blob analysis, gauging, calibration, bar and matrix code reading, OCR, graphics, and display.

ActiveMIL

For fast Windows application development, MIL comes bundled with ActiveMIL, a collection of ActiveX controls (OCXs) for managing image capture, transfer, processing, analysis, and display. ActiveMIL fully integrates into Microsoft Visual Basic or C++ rapid application development (RAD) environments.

ActiveMIL lets you quickly and easily put together an imaging application with a custom, professional-looking, Windows user interface. Application development consists of drag 'n' drop tool placement with point 'n' click configuration, resulting in substantially less coding. Debugging is also simplified with instantaneous validation and error reporting along with detailed descriptions for error resolution. With ActiveMIL, OEMs and integrators save development time by focusing on the imaging task rather than implementing the user interface.

MIL-Lite/ActiveMIL-Lite

MIL-Lite/ActiveMIL-Lite is a subset of MIL/ActiveMIL with functions for image capture, transfer, and display control.

Matrox Intellicam

MIL includes Matrox Intellicam camera configuration utility, a Windows-based program that lets users interactively configure Matrox image capture hardware to acquire from a specific image source.

Matrox Inspector

Matrox Inspector is Windows-based software that provides interactive access to an extensive set of imaging operations.

Developers can use Matrox Inspector as a prototyping tool to quickly build proof-of-concept demonstrations. Matrox Inspector will also meet the needs of end-users (scientists, technicians, and engineers) who need to extract precise measurements, as well as other information, from images.

Supported Environments

	DOS	Windows 98/NT
MIL/MIL-Lite	Watcom C++ (as LIB)	Microsoft Visual C++ (as DLL)
ActiveMIL/ ActiveMIL-Lite	not applicable	Microsoft Visual Basic, Microsoft Visual C++ (as OCX)

Hardware Specifications

Interface

- 32-bit PCI bus master interface
- up to 60 MB/sec transfer rate depending on host computer used
- can generate interrupts towards host computer on grab and synchronization events

Acquisition

- RS-170/CCIR, non-standard analog or digital video input (comes standard with TTL data interface, optional digital input board required for digital data in RS-422 format)
- frame scan or line scan[1] capture

analog interface

- 4 software-selectable video inputs
- variable sampling rate: 5-45 MHz
- 10-bit A/D converter
- 45 MHz maximum sampling at 8-bits or 30 MHz at 10-bits
- phase adjustment from -180° to 90° in 90° increments
- pixel jitter: ± 2ns (when using a stable horizontal reference source)
- S/N ratio: 56 dB

digital interface

- onboard up to 16-bit TTL input
- optional companion board provides up to 16-bit RS-422 at up to 30 MHz

synchronization and control

- hsync, vsync, pixel clock input or output (TTL/RS-422)
- external trigger input (TTL/RS-422)
- 2 exposure (timer) outputs (TTL/RS-422)

video adjustment

- software-programmable input gain, offset, and references
- fully programmable input LUT
- horizontal and vertical sub-sampling by 2 and 4

Display Section

- Matrox MGA 2064W graphics engine
- 2 MB WRAM 8-bits per pixel monochrome image frame buffer
- 2 MB WRAM 8-bits per pixel pseudo color overlay frame buffer
- resolutions up to 1600 x 1200 @ 85 Hz refresh rate
- non-destructive overlay of text and graphics

Connectors pinouts

To see connector pinout diagrams for Matrox Pulsar, please visit the product section of the Matrox Imaging web site: http://www.matrox.com/imgweb/products/pulsar/pulsar.htm

Dimensions and environmental information

Matrox Pulsar

- 31.4 L x 10.7 H cm (12.4" x 4.2") H: bottom edge of goldfinger to top edge of board
- 34.1 L x 10.7 H cm (13.4" x 4.2") includes retainer

Power consumption

- 5V ±5%, 2.2A; 12V± 5%, 150 mA; -12V ± 5%, 40mA; 13.28 W (typical)

Matrox Pulsar digital input module

- 13.0 L x 8.7 H cm (5.1" x 3.4") H: bottom edge of goldfinger to top edge of board

Power consumption

- 5V ± 5%, 520 mA; 2.6 W (typical)

Matrox Pulsar and digital input module

- operating temperature: 0° C to 55° C (32° F to 131° F)
- relative humidity: up to 95% (non-condensing)

Camera interface support

Matrox Pulsar interfaces to a variety of cameras from manufacturers such as Dalsa, Kodak, and Sony. For a more extensive list of supported cameras, please refer to the Matrox Imaging web site, www.matrox.com/imaging. Matrox provides digitizer configuration files (DCFs) and detailed application notes for many cameras. For interfacing to other cameras, developers can use Matrox Intellicam camera configuration software to build or modify DCFs.

Applications

- machine vision
- image analysis
- medical visualization
- robotics
- inspection and process control
- microscopy
- biomedical analysis
- security

Ordering Information

Part number	Description
Hardware	
PULSAR	Standard/non-standard monochrome PCI frame grabber with integrated display.
PULSAR/DIG/MOD	Optional companion board for RS-422 digital video input (up to 16-bit). Comes bundled with a flat cable to connect the input board to the Matrox Pulsar base board.

Ordered separately:

Software	
MIL-LITE/CD	MIL-Lite board control library (see MIL-Lite brochure for more details).
MIL-32/CD	Matrox Imaging Library (MIL) (see MIL brochure for more details).
INSPECTOR-32/CD	Matrox Inspector (see Inspector brochure for more details).

Analog input cables	
IMG-7W2-TO-5BNC	2.4 m (8′) input cable, one 7W2 to five BNCs.
Digital input cables	
DBHD68-TO-OPEN	3.6 m (12′) DBHD-68 to an open end (for synch & control only).
PLS-TTL-CABLE	3.5 m (12′) input cable, DB-37 female on back plate to flat cable connecting into Matrox Pulsar base board.
IM-LCDICBL/OPEN	3.7 m (12′) input cable, DB-37 male to an open end (requires PLS-TTL-CABLE).

Notes:
1. Support for line scan cameras is limited. Please contact Matrox Imaging Sales for more information.
2. Equivalent means that capturing at higher than 1k x 1k is possible at slower frame rates, or higher frame rate capture is possible at lower resolutions. Moreover, the maximum host buffer size is 4 MB per frame (for example 2048 x 2048 x 8) and display buffer size is 2 MB (for example 1600 x 1200 x 8).
3. It supports zoom (x2 or x4), panning and scrolling common to both overlay and image buffers.

For more information, please call: 1-800-804-6243 (toll free in North America) or (514) 822-6020
or e-mail: imaging.info@matrox.com or http://www.matrox.com/imaging

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