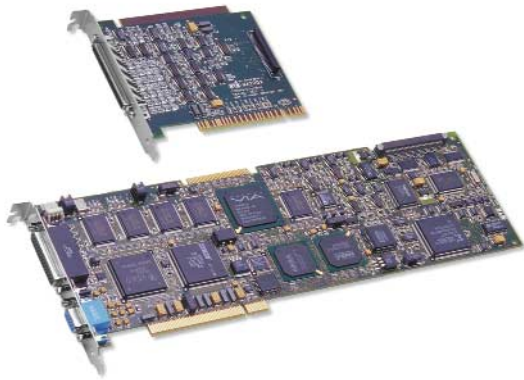# Matrox
Corona

Color/monochrome PCI frame grabber with simultaneous real-time capture to integrated display and transfer to system memory.

MATROX CORONA

Matrox Corona

True-color solution

Matrox Corona is a single-slot frame grabber built for color imaging applications. Besides real-time color acquisition, Matrox Corona handles high bandwidth transfers of up to 24-bit color images over the PCI bus and, at the same time, displays true-color live video with true-color non-destructive overlay. The board's unique architecture includes custom Matrox components for unsurpassed true-color performance.

Two real-time data paths

Simultaneous capture to display and system memory is made possible by the combination of Matrox VIA and Matrox Rainbow Runner bus interface ASICs. For example, using the dual data paths, metrology applications can take advantage of simultaneous real-time transfer of color data to display for visualization and monochrome data to host for processing.

True-color overlay

The dual frame buffer architecture provides non-destructive overlay. With up to 4 MB of image buffer and 4 MB of overlay buffer memory, Matrox Corona can deliver up to 24-bit color image display with up to 24-bit color overlay. Use the power of 16 million colors to build an advanced user interface in image cataloguing and analysis applications.

Video-in-a-window with real-time scaling

Matrox Corona supports high-quality, live video-in-a-window display. The window can be scaled down to any size and positioned anywhere on the screen with no change to your frame rate. Live video images can also be cropped to display only the desired region of interest.
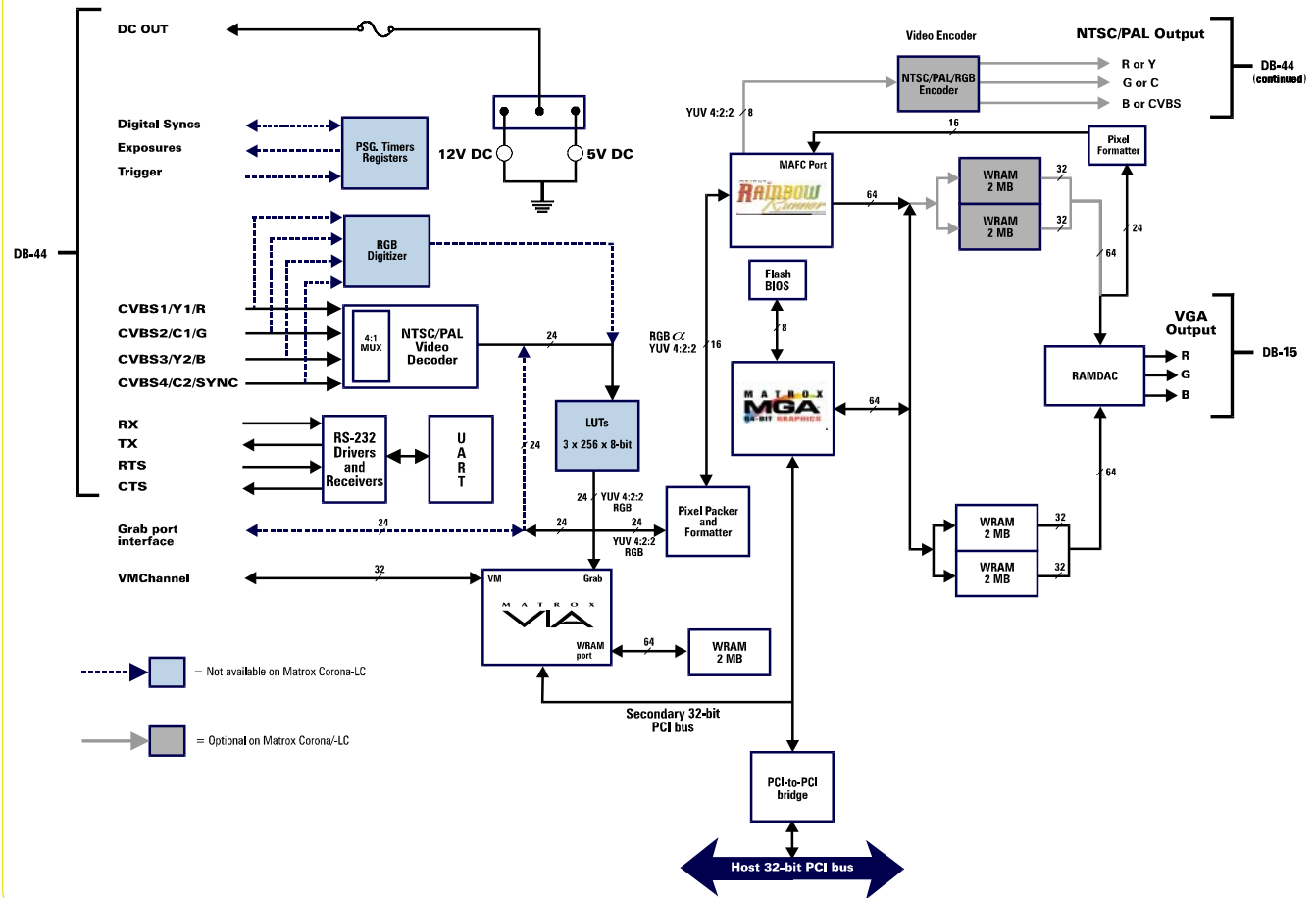
Key Features:

- full size, single-slot PCI frame grabber with integrated display
- captures from standard/non-standard, color/monochrome, analog/digital, frame scan sources
- PCI bus-mastering interface with scatter-gather capabilities
- simultaneous real-time transfer to system and on-board VGA memory at up to 130 MB/sec
- extensive on-board buffering (2 MB) for reliable capture
- supports packed or planar transfers of color or multiple monochrome streams
- true-color display with true-color non-destructive overlay
- display at up to 1600 x 1200
- separate composite, Y/C, or RGB NTSC/PAL video output
- VMChannel™ secondary bus interface
- power output and RS-232 serial interface
- available software includes Matrox Imaging Library (MIL)/ ActiveMIL, MIL-Lite/ ActiveMIL-Lite and Matrox Inspector
- supports Microsoft® Windows® 98, Windows NT® 4.0 and Windows® 2000

**MATROX
IMAGING**

Matrox Corona

Block diagram of the Matrox Corona board showing:

- DC OUT
- Digital Syncs, Exposures, Trigger → PSG. Timers Registers
- 12V DC, 5V DC
- RGB Digitizer
- CVBS1/Y1/R, CVBS2/C1/G, CVBS3/Y2/B, CVBS4/C2/SYNC → 4:1 MUX → NTSC/PAL Video Decoder
- RX, TX, RTS, CTS → RS-232 Drivers and Receivers → UART
- DB-44
- LUTs 3 x 256 x 8-bit
- Grab port interface
- VMChannel
- MATROX VIA (VM, Grab, WRAM port) → WRAM 2 MB
- Pixel Packer and Formatter — YUV 4:2:2 RGB
- Secondary 32-bit PCI bus
- PCI-to-PCI bridge
- Host 32-bit PCI bus
- Video Encoder: NTSC/PAL/RGB Encoder → NTSC/PAL Output (R or Y, G or C, B or CVBS) → DB-44 (continued)
- YUV 4:2:2 8
- MAFC Port — Rainbow Runner
- Flash BIOS
- MATROX MGA 64-BIT GRAPHICS
- RGB α YUV 4:2:2 16
- WRAM 2 MB, WRAM 2 MB
- Pixel Formatter
- RAMDAC → VGA Output (R, G, B) → DB-15
- WRAM 2 MB, WRAM 2 MB

Legend:
- ---▶ = Not available on Matrox Corona-LC
- ──▶ = Optional on Matrox Corona/-LC

Acquisition

Analog

video decoder

Matrox Corona captures standard composite (CVBS) and Y/C NTSC/PAL and composite RS-170/CCIR. Square pixel/CCIR-601 formats are supported, as well as programmable gamma correction and on/off toggling of automatic gain control (AGC). Matrox Corona provides multiple, simultaneous video input connections in one of the following configurations: 4 CVBS, 2 Y/C, 1 Y/C, and 2 CVBS.

RGB digitizer[1]

Matrox Corona also captures from analog variable monochrome or component RGB frame scan sources (interlaced or progressive scan component RGB cameras and single or two-channel progressive scan monochrome cameras). Also supported is the simultaneous acquisition of up to 3 gen-locked RS-170/CCIR cameras.

Sampling rates up to 30 MHz (including VGA) are supported. Signal conditioning on Matrox Corona consists of variable gain amplifiers for handling a variety of input signal levels, as well as 10 MHz low-pass filters to eliminate aliasing. Also supported are independent programmable analog-to-digital converter (ADC) references.

Digital

Matrox Corona has a 24-bit digital interface that supports onboard TTL acquisition at up to 30 MHz. RS-422 and LVDS signaling standards require an optional digital input companion board, and are supported at up to 25 MHz and 30 MHz respectively.

LUTs[1]

Three 256 x 8-bit LUTs are available for manipulating the incoming RGB or monochrome streams.

Synchronization and control

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

External trigger

An external digital (opto-isolated/TTL/RS-422/LVDS) trigger input can reset the acquisition hardware synchronously or asynchronously[1] to provide user control over image capture in relation to external events.

Exposure control[1]

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

Auxiliary I/O[1]

Auxiliary I/Os (2 in/2 out) are also available for general-purpose use.

Image formatting

Image data can be reformatted by Matrox VIA in real-time, prior to transfer to host system or display. Features of Matrox VIA include cropping (ROI capture), independent horizontal and vertical sub-sampling from 2 to 16 (by decimation), and independent horizontal and vertical zoom of 2 and 4 (by replication).

Matrox VIA can also perform reformatting operations specifically designed for reconstructing images from multi-tap cameras in real-time. Image data presented simultaneously in either odd/even pixel, odd/even line, opposite scan segments, or a combination, can be reordered into a proper image with little or no host CPU involvement.

Power output

Matrox Corona can supply 5 or 12V DC power to cameras. Power is taken directly from the PC supply, preventing any overload to the PCI bus.

RS-232 serial interface

RS-232 serial interface enables remote programming of a camera (gain, gamma control, operation mode), motion control unit, or PLC.

Simple connection

Matrox Corona has a single 44-pin external connector for analog video input, separate synchronization and control signals (TTL), DC power output, RS-232 serial interface, and secondary video output (encoder).

The additional companion board for RS-422/LVDS digital video input has a single 80-pin external connector for data, and separate synchronization and control signals.

Host Interface

PCI interface

Matrox Corona features a 32-bit PCI bus master/slave host interface. The bus master mode performs transfers without requiring continuous host intervention at rates up to 130 MB/second sustained.

Extensive buffering (2 MB) ensures reliable real-time transfer of incoming image data to host memory even under high-bus latency conditions, which typically occur in systems with concurrent image capture, display, graphics, network access, disk access and general external I/O. The PCI interface supports image data sub-sampling from 2 to 16 (by decimation) to further reduce required PCI bus bandwidth.

The PCI interface also supports packed or planar transfers of color or multiple monochrome streams. Acquisition-related events such as start and end of frame, and field or sequence capture can be routed to the host CPU as interrupts to optimize concurrent acquisition and processing (double-buffering).

VMChannel™

Included on Matrox Corona is a VMChannel™ 32-bit secondary interface capable of up to 132 MB/second transfers. It provides an additional high-speed link for image transfer between Matrox Corona and other boards, such as Matrox Genesis or Matrox Meteor-II, without unnecessarily overloading the PCI bus.

Display

High resolutions and refresh rates

Matrox Corona'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.

Dual frame buffer architecture

The integrated display section comes with a dual-frame buffer architecture available in two memory configurations: 4 MB WRAM image buffer and 4 MB WRAM overlay buffer; or 2 MB WRAM image buffer and 2 MB WRAM overlay buffer.

True-color non-destructive overlay

The overlay frame buffer enables true-color, 24-bit, non-destructive overlay of desktop and/or separate text and graphics onto the contents of the image frame buffer.

For 4MB image + 4 MB overlay buffer

Pixel depth	Max. display resolution
8/16-bits	1600 x 1200
24-bits	1280 x 1024
32-bits	1152 x 864

For 2MB image + 2 MB overlay buffer

Pixel depth	Max. display resolution
8-bits	1600 x 1200
16-bits	1152 x 864
24/32-bits	800 x 600

Formatting features

Interpolated downscaling along the direct data path to display through Matrox Rainbow Runner is supported by Matrox Corona and Matrox Corona-LC for YUV 4:2:2, RGB and monochrome video data. Matrox Rainbow Runner's support for YUV to RGB conversion enables simultaneous real-time transfer of color data to display for visualization, while monochrome data (Y) is transferred to the host through Matrox VIA for processing.

Video encoder

An NTSC/PAL video encoder provides an additional video output with overlay from Matrox Corona to external video devices (e.g., VCR). The video encoder can be programmed to output square pixel or CCIR 601 resolutions in composite (CVBS), Y/C or component RGB formats.

Single-screen solution

Matrox Corona can act as a main system display of user interface and live video display with text or graphics overlay, all on a single screen.

Dual-screen mode

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

Multi-head mode

Under Windows NT® 4.0 or Windows® 2000, one large virtual desktop can be created and displayed across multiple monitors using, for example, two Matrox Corona boards or a Matrox Corona and a Matrox graphics board. The live video can be displayed across all screens.

Software

Software support is available for Windows® 98, Windows NT® 4.0 and Windows® 2000 and consists of Matrox Imaging Library (MIL)/ ActiveMIL or MIL-Lite/ActiveMIL-Lite development toolkits for creating custom applications, as well as accelerated display drivers. Matrox Corona is also supported by Matrox Inspector Windows®-based interactive imaging software.

Supported Environments

	Windows 98/NT/2000
MIL/MIL-Lite	Microsoft® Visual C++® (as DLL)
ActiveMIL/ ActiveMIL-Lite	Microsoft® Visual Basic®, Microsoft® Visual C++® (as OCX)

Specifications

Acquisition (analog interface)
video decoder
- analog composite (CVBS) or Y/C NTSC/PAL
- analog composite RS-170/CCIR
- supports VCRs
- square pixel or CCIR-601 digitization
- programmable gamma correction table
- controllable AGC (freeze with manual adjust)
- RGB 8:8:8 or YUV 4:2:2 pixel formats
- synchronous trigger input
- connect and switch between either 4 CVBS, 2 CVBS and 1 Y/C, or 2 Y/C sources

RGB digitizer
- three-channel analog variable frame scan
- supports monochrome or RGB interlaced or progressive scan
- sampling rate up to 30 MHz
- pixel jitter of ± 1.5 ns
- variable gain amplifier
- 10 MHz low pass filter
- synchronous and asynchronous trigger

Acquisition (digital interface)[1]
- 24-bit wide
- configurable as 3 x 8-bit, 1 x 16-bit, or 1 x 24-bit
- TTL at up to 30 MHz, RS-422[2] at up to 25 MHz, and LVDS[2] at up to 30 MHz

Synchronization and control
- separate pixel clock, hsync, vsync (TTL/RS-422/LVDS)[1]
- external trigger input (opto-isolated/TTL/RS-422/LVDS)
- 2 exposure (timer) outputs (TTL/RS-422/LVDS)[1]
- auxiliary I/Os[1] (2 in/2 out)

Formatting
- three 256 x 8-bit programmable LUTs[1]
- video downscaling to display

RS-232 interface
- supports RX, TX, RTS, and CTS signals
- not visible to OS (programmed through MIL API)

Power output
- 5 or 12V DC at 1.5A
- from PC power supply (not PCI slot)

Host interfaces PCI
- bus master/slave
- up to 130 MB/second sustained
- capable of scatter-gather DMA
- 2 MB WRAM buffer
- supports packed or planar image data formats
- independent horizontal and vertical sub-sampling both from 2 to 16 (by decimation)
- routes interrupts for start and end of field, frame, and sequence capture

VMChannel™
- 32-bit wide
- up to 132 MB/second transfer rate

Display
- true-color image buffer
- true-color, non-destructive overlay
- resolutions up to 1600 x 1200 @ 85 Hz refresh rate
- separate composite, Y/C and RGB NTSC/PAL video output

Connector pinouts
To see connector pinout diagrams for the Matrox Corona, please visit the product section of the Matrox Imaging web site: www.matrox.com/imgweb/prod/corona/home.htm

Dimensions and environmental information
- 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
- 3.0A for 5V ±5%, 650mA for 12V ±10% and 100mA for -12V ±10%
- operating temperature: 0° C to 55° C (32° F to 131° F)
- relative humidity: up to 95% (non-condensing)

Ordering Information

Part number — Description

Hardware

CORONA/8/E — Standard/non-standard analog color/monochrome area scan PCI frame grabber with integrated 8 MB display and video encoder.

CORONA/4/E — Standard/non-standard analog color/monochrome area scan PCI frame grabber with integrated 4 MB display and video encoder.

COR-DIG-BRD/R — Digital (RS-422) input companion ISA / PCI board.

COR-DIG-BRD/L — Digital (LVDS) input companion ISA / PCI board.

Corona-LC Boards

CORONA-LC/8/E — Standard analog color/monochrome PCI frame grabber with integrated 8 MB display and video encoder.

CORONA-LC/4/E — Standard analog color/monochrome PCI frame grabber with integrated 4 MB display and video encoder.

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

DBHD44-TO-8BNC — 2 m (7') input cable, high density DB-44 to eight BNCs. Includes two SVHS adapters.

DH44-TO-8BNC/0 — 0.9 m (3') input cable, high density DB-44 to eight BNCs and open end (to access synch and control signals). Includes two SVHS adapters.

Digital input cables

DBHD80-TO-OPEN — 3 m (10') input cable, high density DB-80 to an open end (requires customization).

Notes:
1. Not offered with Matrox Corona-LC.
2. Requires additional companion board.

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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