



Frame grabbers

# Matrox Morphis >>

Cost-effective family of boards for standard video capture and/or real-time JPEG2000 compression/decompression<sup>1</sup>.



## Key features

- > x1 PCIe™, PCI (-X<sup>2</sup>) or PC/104-Plus™ form factor
- > captures from NTSC, PAL, RS-170 and CCIR video sources
- > dual/quad video decoder architecture for ultra-fast channel switching
- > connect and switch between up to 16 CVBS, up to 8 Y/C or a combination of inputs
- > two trigger inputs<sup>1</sup>
- > real-time JPEG2000 image compression and decompression<sup>1</sup>
- > real-time image authentication offload engine<sup>1</sup>
- > 16 TTL auxiliary I/Os and RS-485 serial interface
- > watchdog timer for monitoring overall system integrity
- > available software is sold separately and includes Matrox Imaging Library (MIL)/ActiveMIL, MIL-Lite/ActiveMIL-Lite and Matrox Inspector<sup>3</sup>
- > support for Microsoft® Windows® 2000, Windows® XP and Linux<sup>3,4</sup>

## Versatile design

Matrox Morphis is a family of cost-effective peripheral boards based on a truly versatile design. As a frame grabber board, the Matrox Morphis is ideal for video surveillance applications that require sequential capture from multiple standard sources with minimum latency. A modular design and simple standard connections provide additional flexibility and cost savings for video surveillance applications that require a scalable number of inputs. A real-time standard image compression and decompression accelerator for video archiving and/or transmission further qualifies Matrox Morphis for video surveillance applications. As an image compression and decompression board, Matrox Morphis is perfectly adapted for standard medical image archiving and transmission.

### Dual/quad video decoder architecture

An elaborate and finely tuned design featuring up to four video decoders working in tandem enables Matrox Morphis to rapidly switch between multiple video sources for sequential capture. The design also allows for the simultaneous capture from up to four independent standard video sources. A large dedicated buffer guarantees reliable image capture to the on-board compression accelerator<sup>1</sup> or the host PC, including display. Moreover, video images can be formatted in real-time during capture. Formatting features include cropping (ROI), horizontal and/or vertical flipping and subsampling.

### Real-time JPEG2000<sup>1</sup>

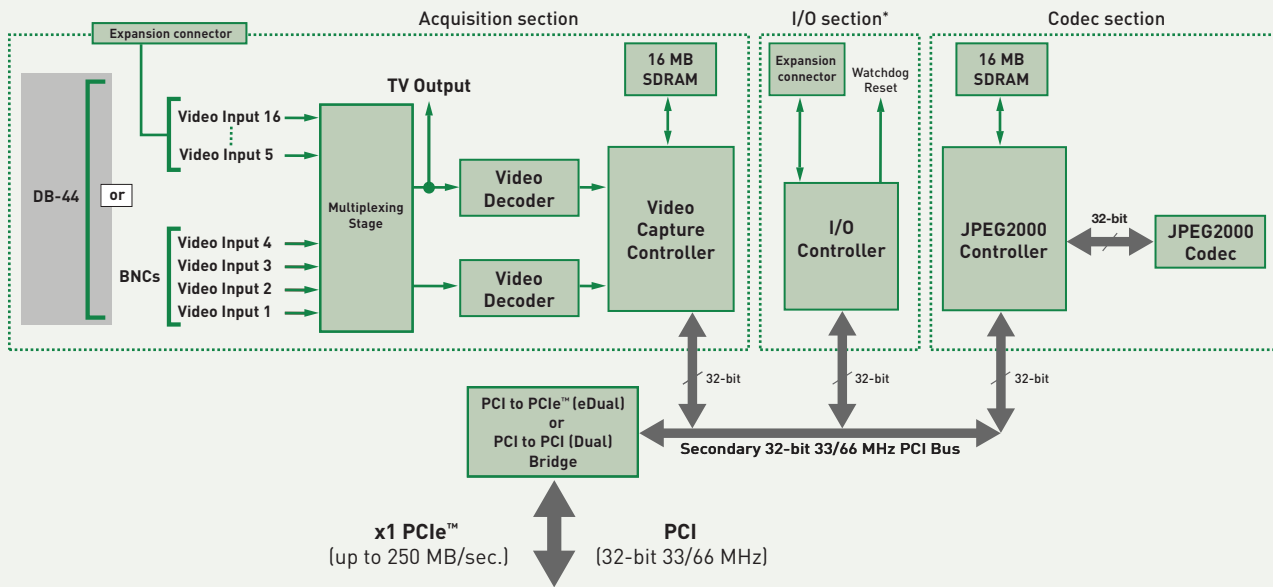
Matrox Morphis integrates a hardware accelerator for JPEG2000 image compression and decompression. JPEG2000 is the emerging industry standard from the Joint Photographic Experts Group for wavelet-based compression and decompression. This new standard was developed to provide a superior compression ratio without compromising quality, or superior quality at a given compression ratio when compared to conventional JPEG. An intricate algorithm makes JPEG2000 computationally intensive, requiring hardware acceleration for real-time performance at typical video rates. For video surveillance applications, the JPEG2000 hardware accelerator can handle up to two standard video streams, whether monochrome or color, in lossy or lossless mode. It can also handle high resolution monochrome formats with high dynamic range found in medical imaging applications.

### Real-time image authentication offload engine<sup>1</sup>

To help identify whether or not an image has been tampered with, Matrox Morphis is available with a real-time image authentication offload engine. Image authentication is based on the 256-bit Secure Hash Algorithm (SHA-256) for fingerprint calculation and the 1024-bit RSA Cryptography standard for fingerprint encryption. Images can later be verified for their authenticity by comparing a newly calculated fingerprint to the decrypted original fingerprint.

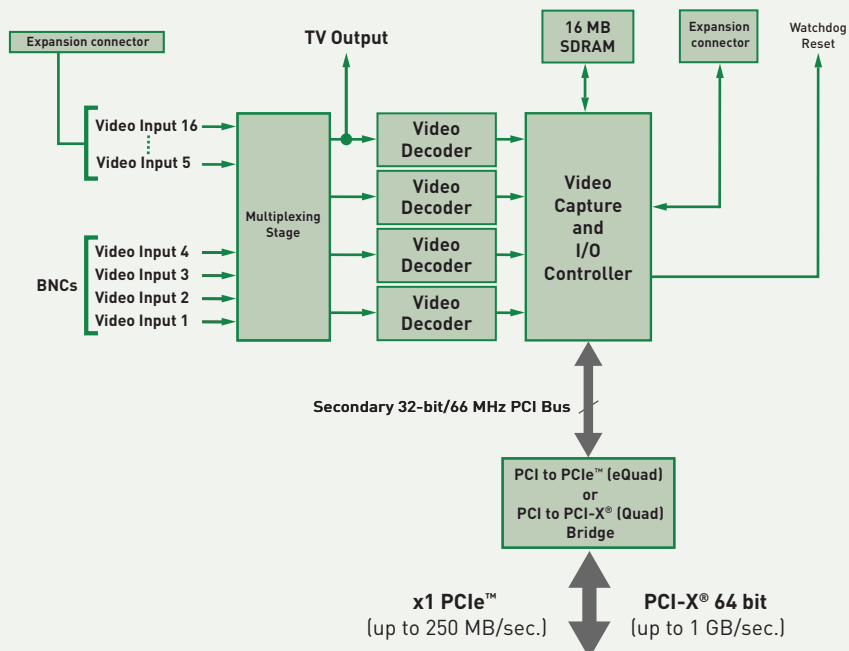


## Matrox Morphis Dual/eDual

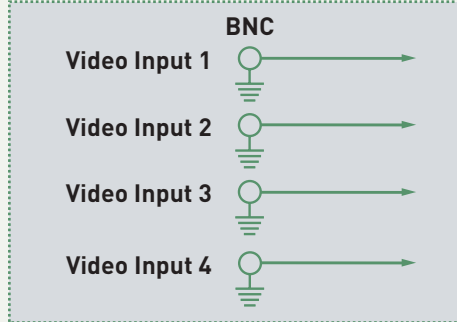


\* Not available on PC/104-Plus™ version.

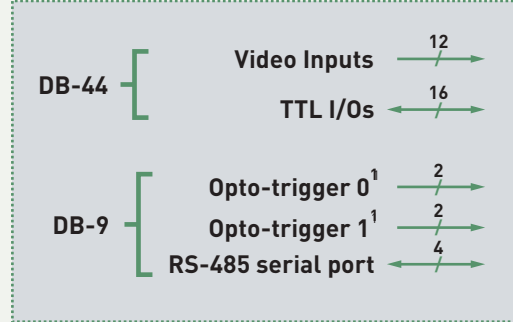
## Matrox Morphis Quad/eQuad



## » Expansion modules for Matrox Morphis Dual/eDual or Quad/eQuad\*



Composite Video Input module<sup>3</sup>



I/O module

\* Expansion modules use additional PC brackets



### Accessory functionality<sup>6</sup>

In addition to the core video capture and compression/decompression functionality<sup>1</sup>, Matrox Morphis incorporates a variety of features to simplify overall integration. These features include an integrated watchdog timer<sup>6</sup> for automatically recovering from application or system failure, integrated auxiliary I/Os<sup>6</sup> that eliminate the need for a separate I/O board, and an RS-485 serial interface<sup>6</sup> mapped as a PC COM port that can be accessed through the Win32<sup>®</sup> API.

### Software

Software support is available for Microsoft<sup>®</sup> Windows<sup>®</sup> 2000, Windows<sup>®</sup> XP and Linux<sup>3,4</sup>, and consists of Matrox Imaging Library (MIL)/ActiveMIL or MIL-Lite/ActiveMIL-Lite development toolkits for creating custom applications. Matrox Morphis is also supported by Matrox Inspector<sup>3</sup> interactive Windows<sup>®</sup> imaging software.

### Specifications

#### Acquisition

- analog composite (CVBS) or Y/C NTSC/PAL
- analog RS-170/CCIR
- dual/quad video decoder video architecture for
  - ultra-fast switching between multiple video sources
  - simultaneous capture from two/four independent video sources
- square pixel digitization
- input cropping (ROI capture)
- horizontal and/or vertical flip
- subsampling to 1/16th of a field or frame
- controllable automatic gain control (freeze with manual adjust)
- BGR32 packed, BGR24 packed, RGB planar, YUV422 packed and MON08 pixel formats
- opto-isolated trigger inputs (synchronized to video)<sup>1,7</sup>
- connect up to 16 CVBS or 8 Y/C or combination

#### Compression/decompression<sup>1</sup>

- JPEG2000 compression/decompression
- supports lossy (9/7 wavelet) and lossless (5/3 wavelet) modes
- handles monochrome (up to 12-bits per pixel) and color (YUV422) images/video
- manages large images (i.e., greater than 1k x 1k) using tiles
- programmable quantization factor, target size and quality
- real-time performance including two standard video streams simultaneously

#### Image authentication

- image fingerprint generation based on 256-bit SHA
- image fingerprint encryption based on 1024-bit RSA cryptography standard
- performed after image capture or compression (if present) at close to 35 fps

## Specifications (cont.)

### Host interface

- 32-bit 33/66 MHz PCI host interface for Matrox Morphis Dual, and 64-bit 33/66 MHz 5/3.3 V PCI and 64-bit 66/100/133 MHz PCI-X host interface for Matrox Morphis Quad
- universal 32-bit card edge connector for Matrox Morphis Dual and universal 64-bit card edge connector for Matrox Morphis Quad
- x1 PCIe™ host interface for Matrox Morphis eDual and eQuad
- x1 PCIe™ card for for Matrox Morphis eDual and eQuad
- interrupts for start and end of field, frame, and sequence capture

### Connectors

- BNCs or DB-44 for all composite video signals
- DB-44 and DB-9 for composite video inputs, Y/C inputs, TTL I/Os and RS-485 serial interface

### RS-485 interface<sup>6</sup>

- supports RX and TX signals
- half-duplex mode
- mapped as a PC COM port (visible to OS)

### Dimensions and environmental information

- MOR/2VD/J2K, MOR/2VD/J2K/HD, MOR/2VD, MOR/2VD/HD, MOR/4VD and MOR/J2K: 16.7 cm L x 10.7 cm H (6.6" x 4.2")<sup>8</sup>
- MOR+/2VD/J2K, MOR+/2VD and MOR+/J2K: 9.0 cm L x 9.6 cm H (3.5" x 3.78")<sup>8</sup>
- MOR-4COMP: 5.6 cm L x 9.1 cm H (2.2" x 3.6")<sup>8</sup>
- MOR-IO: 6.9 cm L x 10.7 cm H (2.7" x 4.2")<sup>8</sup>
- operating temperature: 0° C to 55° C (32° F to 131° F)
- relative humidity: up to 95% (non-condensing)
- FCC class B for PCI[-X<sup>2</sup>] and FCC class A for PC/104-Plus™
- CE class B for PCI[-X<sup>2</sup>] and CE class A for PC/104-Plus™
- RoHS-compliant

### Software Environment

- host driver for Microsoft® Windows® 2000, Windows® XP and Linux<sup>3</sup>
- programmed under Microsoft® Windows® using MIL/MIL-Lite (C DLLs) with Microsoft® Visual C++® (.NET 2003)
- programmed under Microsoft® Windows® using ActiveMIL/ActiveMIL-Lite (ActiveX controls) with Microsoft® Visual Basic®.NET 2003 or C++® .NET 2003
- programmed under Linux<sup>3,4</sup> using MIL/MIL-Lite with GNU Compiler Collection (GCC)

## Ordering Information

### Hardware

Part number	Description
MOR/4VD*	Standard analog color/monochrome PCI-X frame grabber with four video decoders. Video input through BNC connectors.
MOR4VDE*	Standard analog color/monochrome PCIe x1 frame grabber with four video decoders. Video input through BNC connectors.
MOR/2VD/J2K/A*	Standard analog color/monochrome PCI frame grabber with two video decoders, integrated JPEG2000 accelerator and image authentication. Video input through BNC connectors.
MOR2VDJ2KAE*	Standard analog color/monochrome PCIe x1 frame grabber with two video decoders, integrated JPEG2000 accelerator and image authentication. Video input through BNC connectors.
MOR/2VD/J2K*	Standard analog color/monochrome PCI frame grabber with two video decoders and integrated JPEG2000 accelerator. Video input through BNC connectors.
MOR2VDJ2KE*	Standard analog color/monochrome PCIe x1 frame grabber with two video decoders and integrated JPEG2000 accelerator. Video input through BNC connectors.
MOR/2VD/J2K/HD*	Standard analog color/monochrome PCI frame grabber with two video decoders and integrated JPEG2000 accelerator. Video input through HD-44 connector.
MOR/2VD*	Standard analog color/monochrome PCI frame grabber with two video decoders. Video input through BNC connectors.
MOR2VDE*	Standard analog color/monochrome PCIe x1 frame grabber with two video decoders. Video input through BNC connectors.
MOR/2VD/HD*	Standard analog color/monochrome PCI frame grabber with two video decoders. Video input through HD-44 connector.
MOR/J2K*	JPEG2000 accelerator PCI board.
MORJ2KE*	JPEG2000 accelerator PCIe x1 board.
MOR-4COMP*	Add-on module for 4 additional CVBS inputs.
MOR-IO*	Add-on module for 12 additional CVBS inputs or 6 Y/C, 16 TTL I/Os and RS-485 serial port.
MOR+/2VD/J2K/A*	Similar to MOR/2VD/J2K/A but for PC/104-Plus form factor.
MOR+/2VD/J2K*	Similar to MOR/2VD/J2K but for PC/104-Plus form factor.
MOR+/2VD*	Similar to MOR/2VD but for PC/104-Plus form factor.
MOR+/J2K*	Similar to MOR/J2K but for PC/104-Plus form factor.

## Ordering Information (cont.)

Part number	Description
MIL LITE 8 WIN	MIL-Lite board control library for Windows® 2000 and Windows® XP (see MIL-Lite brochure for more details).
MIL 8 WIN P or U	Matrox Imaging Library (MIL) for Windows® 2000 and Windows® XP (see MIL brochure for more details).
MIL LITE 8 LNX <sup>3,4</sup>	Mil-Lite board control library for Linux <sup>3,4</sup> (see MIL brochure for more details).
MIL 8 LNX U <sup>3,4</sup>	Matrox Imaging Library (MIL) for Linux <sup>3,4</sup> (see MIL brochure for more details).
INSPECTOR P or U <sup>3</sup>	Matrox Inspector interactive Windows® imaging software (see MIL brochure for more details).

### Notes:

1. Morphis Dual only.
2. Morphis Quad only.
3. Contact local representative or Matrox Imaging Sales for availability.
4. Contact local representative or Matrox Imaging Sales for supported distribution.
5. Cannot be used with boards that have HD-44 connector (/HD).
6. Not available on PC/104-Plus™ version.
7. One per video decoder.
8. Dimension from bottom edge of goldfinger to top edge of board.

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