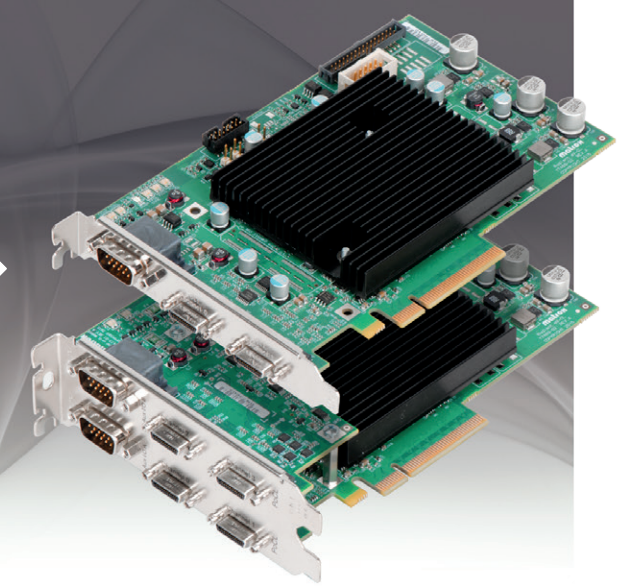
Matrox **Radient eV-CL**

Feature-packed high-performance Camera Link® frame grabber



Benefits

Support the most high-performance Camera Link cameras with available support for Full and 80-bit mode at up to 85 MHz.

Perform deterministic image acquisition by way of the jitter-free Camera Link 2.0 interface.

Eliminate missed frames through a PCIe® 2.0 x8 host interface and ample on-board buffering.

Optimize multi-camera applications via support for up to four (4) Base or two (2) Full/80-bit Camera Link cameras per board.

Minimize space requirements and maximize PC compatibility through a half-length design with mini Camera Link connectivity for true single slot operation.

Improve and simplify system connectivity with Power over Camera Link (PoCL) support at extended cable lengths.

Maintain flexibility and choice by way of 32-bit and 64-bit Windows® 7/8.1/10 and Linux®, and RTX64[1] (RTOS) support.

Feature-packed Camera Link frame grabber

The Matrox Radient eV-CL is a Camera Link frame grabber with the most comprehensive features currently available in the industry. Built upon the field-proven design of the Radient eV–series of frame grabbers, the new Matrox Radient eV-CL offers reliable image acquisition, extended cable length support, and high frame rate image capture that will extend the effectiveness of the Camera Link standard for many years to come.

Versatile high-performance image acquisition

The Matrox Radient eV-CL is capable of handling image capture from a single lowest-data-rate Camera Link device to multiple maximum-bandwidth Camera Link cameras. With the possibility of interfacing up to four (4) Base or two (2) Full/80-bit mode Camera Link cameras at up to 85 MHz on a single board with Power over Camera Link (PoCL) support, the Matrox Radient eV-CL provides users with the flexibility to configure the system to best match their imaging needs while simplifying overall setup.

A PCIe 2.0 x8 host interface provides the throughput necessary to ensure the continuous flow of pixels from the Matrox Radient eV-CL to host memory. With a peak bandwidth of up to 4GB/s, the Matrox Radient eV-CL's host interface prevents pixels from inadvertently being discarded. Furthermore, via a programmable option, the Matrox Radient eV-CL is capable of handling applications where image capture rates exceed the tens of thousands of frames per seconds, all without host intervention. The Matrox Radient eV-CL is also designed to work at extended cable lengths. The feature allows cameras to be placed at distances previously not possible from the computer while maintaining the same maximum throughput.

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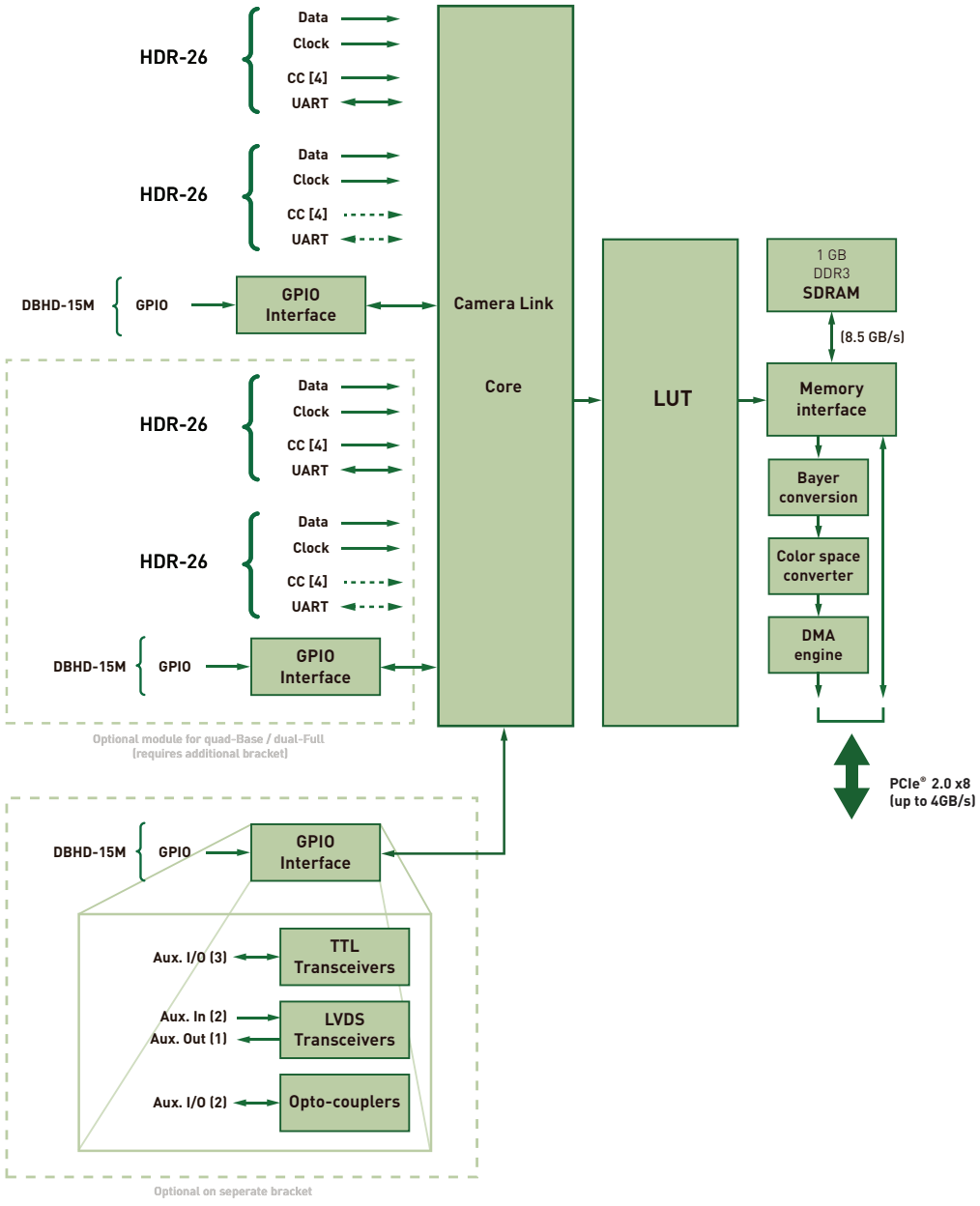
Lifecycle managed for consistent long term supply

Each component on the Matrox Radient eV-CL has been carefully selected to ensure product availability in excess of five years. The Matrox Radient eV-CL is also subject to strict change control to provide consistent supply. Longevity of stable supply lets you achieve maximum return on the original investment by minimizing the costs associated with the repeated validation of constantly-changing products.

Field-proven application development software

The Matrox Radient eV-CL is supported by the Matrox Imaging Library (MIL), a comprehensive collection of software tools for developing industrial imaging applications. MIL features interactive software and programming functions for image capture, processing, analysis, annotation, display and archiving. These tools are designed to enhance productivity, thereby reducing the time and effort required to bring your solution to market. Refer to the MIL datasheet for more information

Matrox Radient eV-CL block diagram



Specifications

Hardware

- Half-length, full-height board
- PCIe® 2.0 x8 host bus interface
- 1 GB of DDR3 SDRAM
- Camera Link® 2.0 compliant
  - Two (2) independent Base Camera Link® ports (dual-Base)
  - One (1) Medium/Full Camera Link® port (single-Full)
    - up to 80-bit mode
  - Four (4) independent Base Camera Link® ports (quad-Base)
  - Two (2) independent Medium/Full Camera Link® ports (dual-Full)
    - up to 80-bit mode
  - 20 MHz to 85 MHz Camera Link® clock
  - Power over Camera Link® with SafePower
- Extended Camera Link® cable length support
- Supports frame and line scan sources
- On-board image reconstruction
- On-board color space conversion
  - Input formats
    - Mono/Bayer 8-bit and 16-bit
    - BGR packed 24-bit and 48-bit
  - Output formats
    - Mono 8-bit and 16-bit
    - BGR packed 24-bit and 48-bit
    - BGR planar 24-bit and 48-bit
    - YUV 16-bit
    - BGRa 32-bit
- On-board look-up tables (LUTs)
  - 8/10/12 bit support
- On-board Bayer conversion
  - GB, BG, GR, RG pattern support
- One (1) / two (2) DBHD-15 male GPIO connector(s) (dual-Base and single-Full / quad-Base and dual-Full)
  - Three (3) TTL configurable auxiliary I/O's
  - Two (2) LVDS auxiliary inputs
  - One (1) LVDS auxiliary output
  - Two (2) opto-isolated auxiliary inputs
- One (1) / two (2) optional additional DBHD-15 male GPIO connector(s) (dual-Base / quad-Base)
  - Three (3) TTL configurable auxiliary I/O's
  - Two (2) LVDS auxiliary inputs
  - One (1) LVDS auxiliary output
  - Two (2) opto-isolated auxiliary inputs
- Support for one (1) quadrature rotary encoder per Camera Link® port
- MIL license fingerprint and storage

Specifications (Cont.)

Software

- Matrox Imaging Library (MIL) drivers for 32/64-bit Windows 7/8.1/10
- MIL drivers for 32/64-bit Linux®
- Implements GenICam™ 2.3.1 (CLProtocol 1.1) and GenICam GenCP 1.0 under Windows/Linux
- MIL drivers for RTX64[1]

Dimensions and environmental information

- 167.6 mm L x 111.1 mm x 18.7 mm (6.6" x 4.38" x 0.74")
- operating temperature: 0°C to 55°C (32°F to 131°F)
- FCC class A
- CE class A
- RoHS-compliant

Ordering Information

Hardware

Part number & Description	
RAD EV 1G CLDB	Matrox Radient eV-CL dual-Base Camera Link® PCIe® 2.0 x8 frame grabber with 1GB DDR SDRAM and HDR26 (mini CL) connectors. Includes cable adaptor (aux. I/O).
RAD EV 1G CLSF	Matrox Radient eV-CL single-Full Camera Link® PCIe® 2.0 x8 frame grabber with 1GB DDR SDRAM and HDR26 (mini CL) connectors. Includes cable adaptor (aux. I/O).
RAD EV 1G CLQB	Matrox Radient eV-CL quad-Base Camera Link® PCIe® 2.0 x8 frame grabber with 1GB DDR SDRAM and HDR26 (mini CL) connectors. Includes cable adaptor (aux. I/O). Ask for availability.
RAD EV 1G CLDF	Matrox Radient eV-CL dual-Full Camera Link® PCIe® 2.0 x8 frame grabber with 1GB DDR SDRAM and HDR26 (mini CL) connectors. Includes cable adaptor (aux. I/O). Ask for availability.

Notes:
1. Ask for availability.

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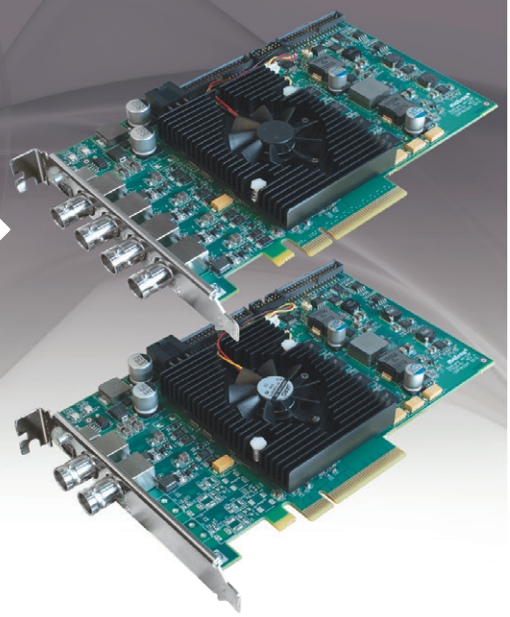
or e-mail: imaging.info@matrox.com or http://www.matrox.com/imaging

Matrox **Radient eV-CXP**

Value-packed high-performance CoaXPress frame grabber.



Benefits

- **Capture from the next generation of higher resolution and higher speed cameras** using the CoaXPress (CXP) interface
- **Acquire from multiple independent cameras at once** by way of two (Dual) or four (Quad) CXP connections each supporting up to 6.25 Gbps of input bandwidth
- **Interface to the highest performance cameras** through the ability to combine CXP connections for up to 25 Gbps of input bandwidth
- **Ensure reliable delivery to host memory** by way of PCIe® 2.0 x8 host interface and ample on board buffering
- **Maximize PC compatibility and minimize slot usage** through a half-length design with video inputs and auxiliary I/Os on the same bracket[1]
- **Reduce cabling complexity and eliminate power supplies** by way of Power over CoaXPress (PoCXP) support
- **Offload host processing** with on-board peak location for 3D profiling[2], Bayer interpolation, color space conversion and look-up tables
- **Simplify application development** using the Matrox Imaging Library (MIL) toolkit on 32-bit and 64-bit Windows® 7/8.1/10 and Linux®, and RTX64[3] (RTOS)

Value-packed high-performance CoaXPress frame grabber

The Matrox Radient eV-CXP is a cost-effective CoaXPress (CXP) frame grabber with specific models supporting up to two (Dual) or four (Quad) simultaneous connections. By combining a field proven design with the new CXP interface, the Matrox Radient eV-CXP is a dependable high-performance image capture solution for today and into the foreseeable future.

Moving forward with CoaXPress

CoaXPress is a new camera interface standard that takes advantage of common coax cabling to transmit images at rates and distances above and beyond previous standards. With CXP, image data can be transmitted at up to 6.25 Gbps using a single coaxial cable and up to 25 Gbps using four cables to a maximum of 40 meters[4]. CXP's high-bandwidth makes it the right match for a new generation of cameras with larger and faster image sensors.

CXP's full duplex design enables the transmission of camera configuration and control along with image data on the same cable. The Power over CoaXPress (PoCXP) capability further simplifies cabling by providing a camera with up to 13W per cable. This unified cabling facilitates the upgrade of legacy imaging systems from analog to digital.

Reliable high-performance image acquisition

The Matrox Radient eV-CXP provides two (Dual) or four (Quad) independent CXP connections through BNC connectors. This allows for simultaneous capture from up to two (Dual) or four (Quad) cameras each running at different CXP speeds (i.e., 1.25, 2.5, 3.125, 5.0 or 6.25 Gbps). For high-bandwidth applications, the Radient eV-CXP frame grabber can also capture from a single camera transmitting image data at up to 12.5 Gbps (Dual) or 25 Gbps (Quad) using connection aggregation.

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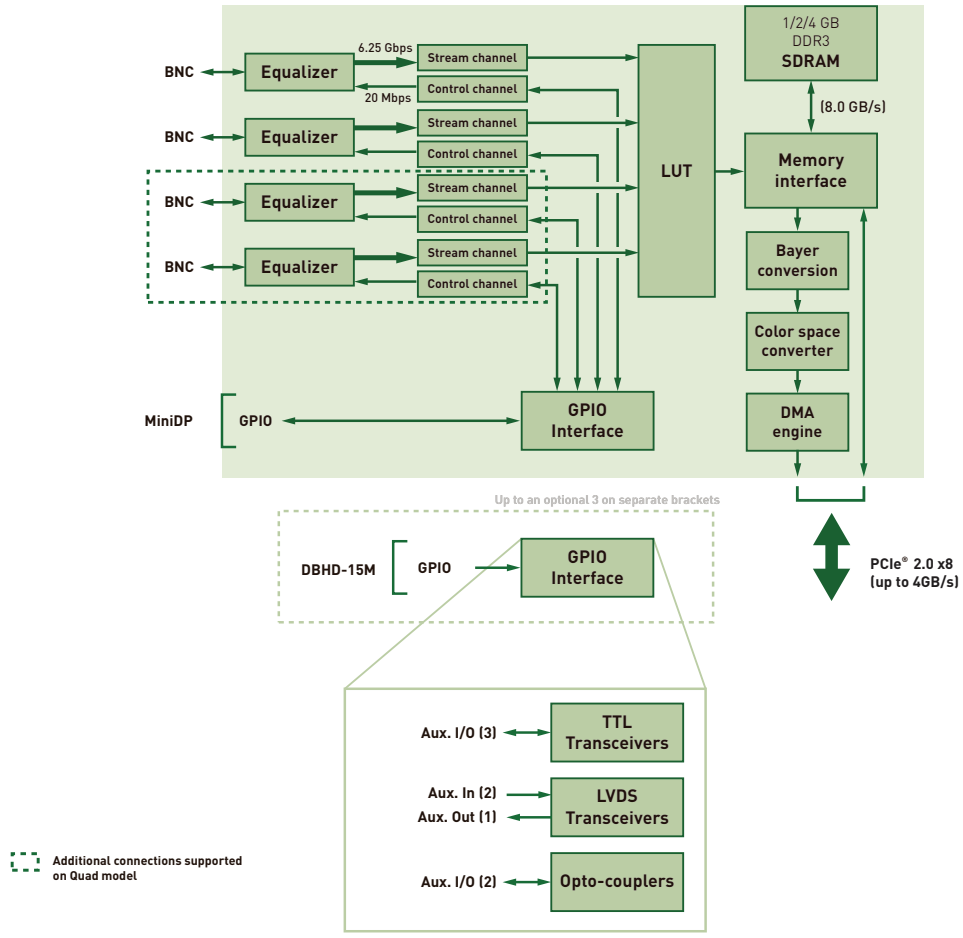

Reliable high-performance image acquisition (cont.)

To reliably handle these high data rates, the Matrox Radient eV-CXP uses a PCIe® 2.0 x8 host interface – with a peak transfer rate of up to 4GB/s – combined with up to 4GB SDRAM of on-board buffering. The frame grabber can also offload the host CPU from having to perform image pre-processing task (i.e., peak location for 3D profiling[2], Bayer interpolation, color space conversion and LUT mapping).

The Matrox Radient eV-CXP further simplifies overall system integration by providing camera power, trigger and control over each CXP connection, as well as two (Dual) or four (Quad) independent sets of auxiliary I/O for interfacing with rotary encoders, photoelectric sensors and strobe controllers. By having the primary set of auxiliary I/Os on the same bracket as the BNC connections, the Matrox Radient eV-CXP offers a true single PCIe® slot solution for single camera applications[5].

Lifecycle managed for consistent long term supply

Each component on the Matrox Radient eV-CXP was carefully selected to ensure product availability in excess of five years. The Matrox Radient eV-CXP is also subject to strict change control to provide consistent supply. Longevity of stable supply lets you achieve maximum return on the original investment by minimizing the costs associated with the repeated validation of constantly-changing products.

Field-proven application development software

The Matrox Radient eV-CXP is supported by the Matrox Imaging Library (MIL), a comprehensive collection of software tools for developing industrial imaging applications. MIL features interactive software and programming functions for image capture, processing, analysis, annotation, display and archiving. These tools are designed to enhance productivity, thereby reducing the time and effort required to bring your solution to market. Refer to the MIL datasheet for more information.

Specifications

Hardware

- half-length full-height board
- PCIe® 2.0 x 8 host bus interface
- 1/2/4 GB of DDR3 SDRAM
- CoaXPress (CXP) acquisition
  - JIIA NIF-001-2010 Ver. 1.0 certified
  - two (Dual) or four (Quad) independent CXP connections (up to 6.25 Gbit/s)
    - BNC connector
    - Power over CXP (PoCXP) with Safe Power (up to 13W)
    - Auto connection speed detection
    - LED indicator of connection state
- supports frame and line scan sources
- on-board image reconstruction
- on-board color space conversion
  - input formats
    - 8/16-bit mono/Bayer
    - 24/48-bit packed BGR
  - output formats
    - 8/16-bit mono
    - 24/48-bit packed/planar BGR
    - 16-bit YUV
    - 16-bit YCbCr
    - 32-bit BGRa
- on-board look-up tables (LUTs)
  - 8/10/12 bit support
- on-board Bayer conversion
  - GB, BG, GR and RG pattern support
- on-board peak location for 3D profiling[2]
  - up to 3 peaks per frame
  - maximum frame height of 512 lines
- Up to four (4) DBHD-15 male GPIO connectors (one (1) on main board through MiniDP adaptor cable and three (3) on separate brackets)
  - three (3) TTL configurable auxiliary I/Os
  - two (2) LVDS auxiliary inputs
  - one (1) LVDS auxiliary output
  - two (2) opto-isolated auxiliary inputs
- support for one (1) quadrature rotary encoder per CXP connection
- MIL License fingerprint and storage

Dimensions and environmental information

- 167.6 mm L x 111.1 mm x 18.7 mm (6.6" x 4.38" x 0.74")
- 250m A @ 3.3V, 1.25 @ 12V or 15.8 W total power
- operating temperature: 0°C to 55°C (32°F to 131°F)
- FCC Class A
- CE Class A
- RoHS-compliant

Software drivers

- Matrox Imaging Library (MIL) drivers for 32/64-bit Windows® 7/8.1/10
- MIL driver for RTX64[3]
- MIL drivers for 32/64-bit Linux®

Ordering Information

Hardware

Part number	Description
RAD EV 1G 2C6*	Dual CXP-6 (6.25 Gbps) frame grabber with 1GB DDR3 SDRAM. Includes cable adaptor.
RAD EV 1G 4C6*	Quad CXP-6 (6.25 Gbps) frame grabber with 1GB DDR3 SDRAM. Includes cable adaptor.
RAD EV 1G 4C6 /3D*	Quad CXP-6 (6.25 Gbps) frame grabber with 1GB DDR3 SDRAM for 3D profiling. Includes cable adaptor.
RADACCPAK01*	Accessory kit for RAD EV 1G 2C6*, RAD EV 1G 4C6*, and RAD EV 1G 4C6 /3D*. Includes two (2) aux. I/O cable adaptors, each with two (2) DBHD-15 male connectors.

Software

Refer to MIL datasheet.

Cables

CoaXPress cables available from camera manufacturer, Components Express, Inc. (http://www.componentsexpress.com) or other third parties. GPIO cables available from third parties.

Notes:
1. Applies to single camera applications. Multi-camera applications may require auxiliary I/Os located on additional brackets.
2. With Radient eV-CXP for 3D profiling (RADEV1G4C6/3D*) and MIL 10 Update 29 (or successor)
3. Ask for availability.
4. Distances of over 100m can be achieved at 3.125 Gbps.
5. Additional sets of auxiliary I/Os for multi-camera applications are available through additional adaptor brackets sold seperately.

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