ZEBRA
CAPTURE
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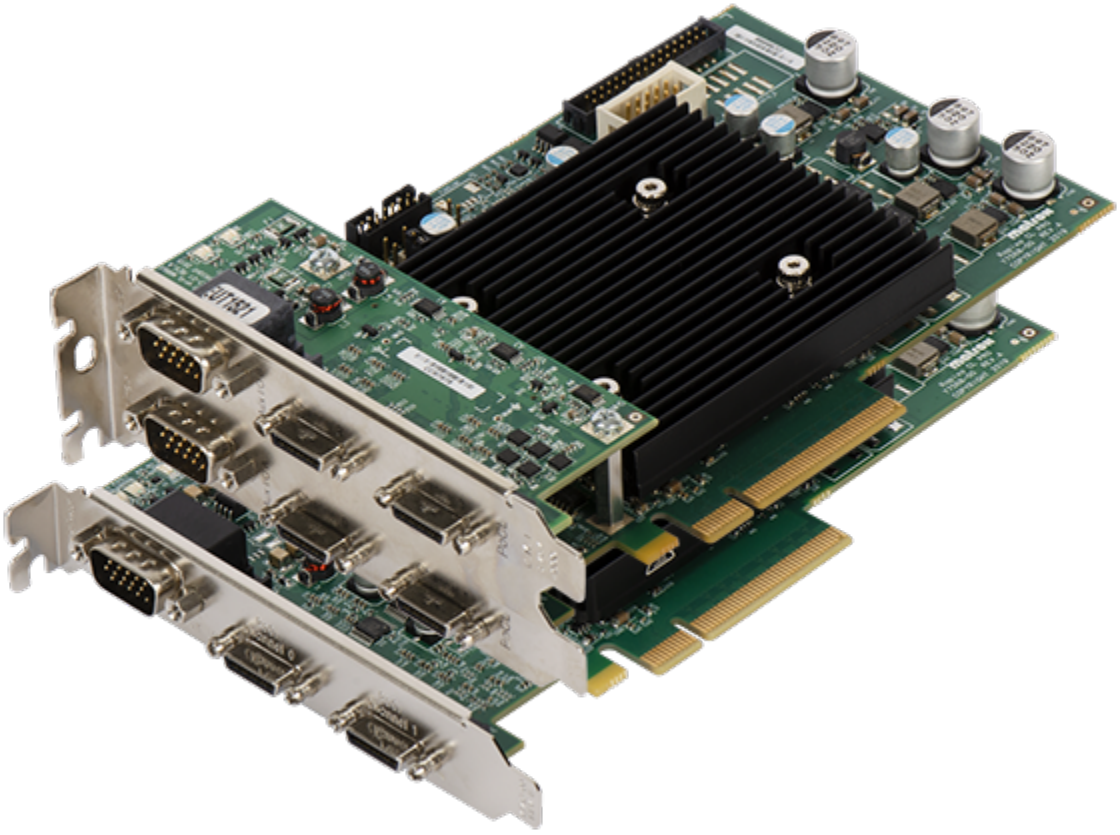


Zebra **Rapixo CL Pro**

Featured-packed high-performance Camera Link frame grabbers with FPGA-based image processing offload

Overview

Comprehensive Camera Link frame grabber series

Zebra® Rapixo CL Pro is a series of Camera Link® frame grabbers with the most comprehensive features currently available in the industry. Built upon the field-proven design of the Zebra Radient eV series of Camera Link frame grabbers, the Zebra Rapixo CL Pro offers reliable image acquisition, extended cable length support, high frame-rate image capture, and onboard image processing offload that will extend the effectiveness of the Camera Link standard for years to come.

FPGA-based image processing offload

The Zebra Rapixo CL Pro makes use of an FPGA device from the Xilinx Kintex™-7 family that integrates the controlling, formatting, and streaming logic of the various interfaces, and also allows developers to incorporate Zebra or user-developed custom image pre-processing operations to offload from the host computer. Operations performed onboard are controlled through Zebra Aurora Imaging Library (formerly Matrox Imaging Library), application-development software. Within Aurora Imaging Library, an existing FPGA configuration can be rearranged to perform a required sequence of operations without necessarily having to generate a new FPGA configuration. Using the Aurora FDK, developers generate their own FPGA configurations with custom operations written in C/C++.

Versatile high-performance image acquisition

The Zebra Rapixo CL Pro 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 Base or two Full/80-bit mode Camera Link cameras at up to 85 MHz on a single board with PoCL support, the Zebra Rapixo CL Pro provides users with the flexibility to configure systems to best match 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 Zebra Rapixo CL Pro to host memory. With a peak bandwidth of up to 4 GB/s, the Zebra Rapixo CL Pro's host interface prevents pixels from inadvertently being discarded. Furthermore—thanks to a programmable option—the Zebra Rapixo CL Pro is capable of handling applications where image-capture rates exceed the tens of thousands of frames per seconds, all without host intervention. The Zebra Rapixo CL Pro is also designed to work at extended cable lengths, allowing cameras to be placed at distances previously not possible from the computer while maintaining the same maximum throughput.

Zebra Rapixo CL Pro at a glance

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 2.1 interface

Offload host computer of custom image processing using a field-programmable gate array (FPGA) device

Eliminate missed frames through a PCIe® 2.0 x8 host interface and ample onboard buffering

Optimize multi-camera applications via support for up to four Base or two 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

Lifecycle managed for consistent long-term supply

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

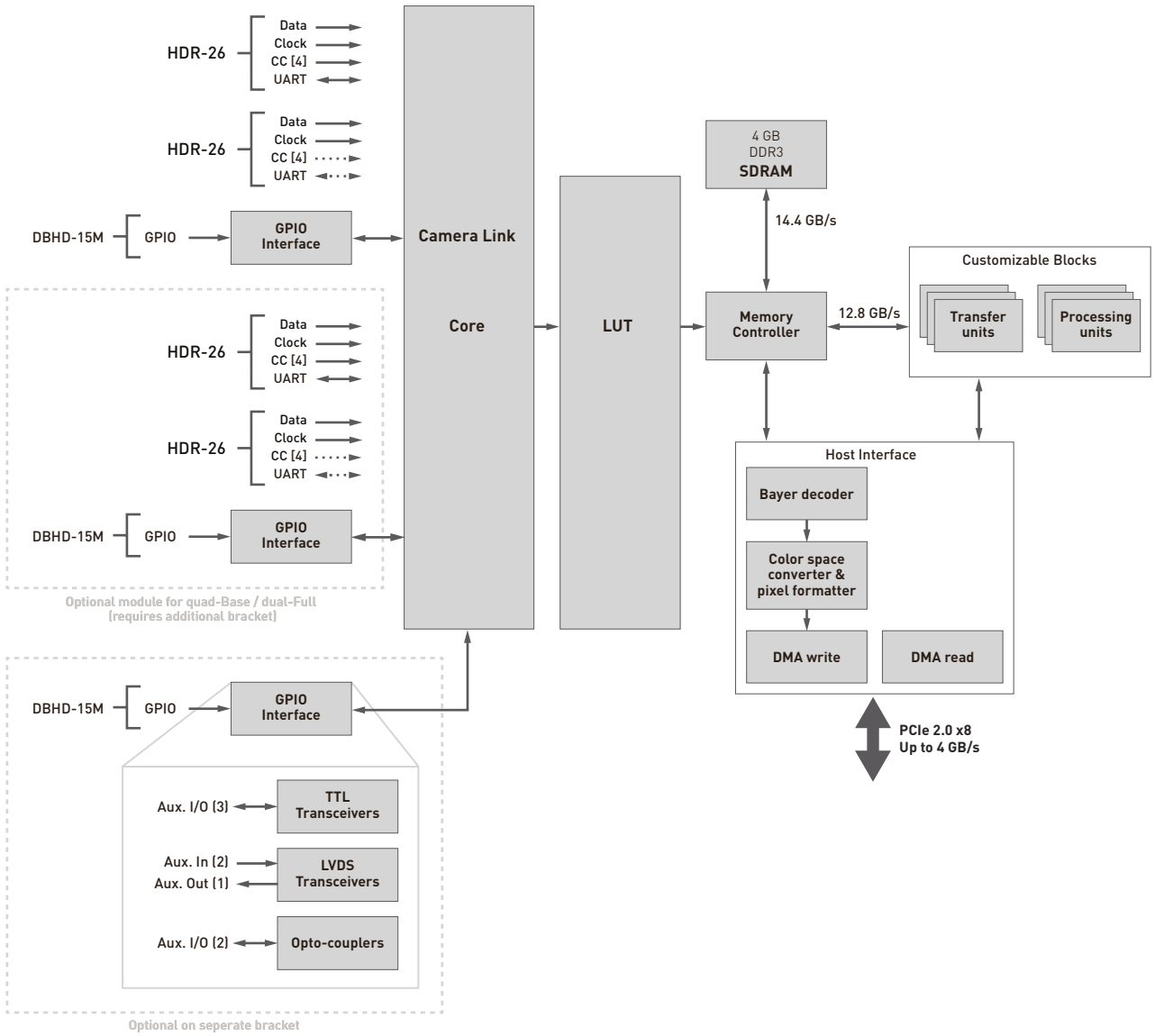
Software Environment

Field-proven application development software

Zebra Rapixo CL Pro is supported by Aurora Imaging Library, a comprehensive collection of software tools for developing industrial imaging applications. Aurora Imaging Library 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 solutions to market. Refer to the Aurora Imaging Library datasheet for more information.

Connectivity

Zebra Rapixo CL Pro block diagram



Specifications

Zebra Rapixo CL Pro	
Hardware	
Host interface	
Interconnect	PCIe 2.0 x8
Camera/video interface	
Standard	Camera Link 2.1
Configuration	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
Speeds	20 MHz to 85 MHz Camera Link clock
Connectors	HDR26 (mini Camera Link)
Power output	PoCL with SafePower
Miscellaneous	Extended Camera Link cable length support
	Supports frame and line scan sources
Memory	
Type	DDR3 SDRAM
Quantity	4 GB
Purpose	Image buffering and processing
Image processing capabilities	
Onboard look-up tables	8-/10-/12-bit support
Onboard Bayer interpolation	GB, BG, GR, and RG pattern support
Onboard 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, 32-bit BGRa
Custom processing	Aurora Imaging- or user-developed using Xilinx Vivado® Design Suite and Aurora FDK
I/Os	
Types	Three (3) TTL configurable auxiliary I/Os per Camera Link port
	Two (2) LVDS auxiliary inputs per Camera Link port
	One (1) LVDS auxiliary output per Camera Link port
	Two (2) opto-isolated auxiliary inputs per Camera Link port
Connectors	One (1) / two (2) DBHD-15 male GPIO connector(s) (dual-Base and single-Full / quad-Base and dual-Full)
	One (1) / two (2) optional additional DBHD-15 male GPIO connector(s) (dual-Base / quad-Base)
I/Os synchronization	One (1) quadrature rotary encoder per Camera Link port
	Four (4) 16-bits timer
Physical	
Form factor	Half-length, full-height, PCIe add-in card
Dimensions (L x W x H)	167.6 x 111.1 x 18.7 mm (6.6 x 4.38 x 0.74 in)
	Additional Camera Link module for quad-Base / dual-Full: 45.0 x 106.65 x 18.7 mm (1.77 x 4.20 x 0.74 in)

Specifications (cont.)

Zebra Rapixo CL Pro	
Environmental	
Operating temperature	0°C to 55°C (32°F to 131°F)
Certifications	
Electromagnetic compatibility	FCC Class A
	CE Class A
Substance control	RoHS-compliant
Software	
Compatible software	Aurora Imaging Library
Operating system support	Windows 7 (64-bit)
	Windows 10 (64-bit)
	Linux (64-bit)
Camera communication	GenICam CLProtocol 1.2
	GenICam GenCP 1.3
Licensing provisions	Aurora Imaging Library license fingerprint and storage

Ordering Information

Part number	Description
Hardware	
RAP 4G CL DB P325	Zebra Rapixo CL Pro dual-Base Camera Link PCIe 2.0 x8 frame grabber with 4 GB DDR3 SDRAM, Xilinx Kintex 7 325T FPGA, and HDR26 (mini Camera Link) connectors. Includes cable adaptor for third and fourth GPIOs.
RAP 4G CL SF P325	Zebra Rapixo CL Pro single-Medium/Full Camera Link PCIe 2.0 x8 frame grabber with 4 GB DDR3 SDRAM, Xilinx Kintex 7 325T FPGA, and HDR26 (mini Camera Link) connectors. Includes cable adaptor for third and fourth GPIOs.
RAP 4G CL QB P325	Zebra Rapixo CL Pro quad-Base Camera Link PCIe 2.0 x8 frame grabber with 4 GB DDR3 SDRAM, Xilinx Kintex 7 325T FPGA, and HDR26 (mini Camera Link) connectors. Includes cable adaptor for third and fourth GPIOs.
RAP 4G CL DF P325	Zebra Rapixo CL Pro dual-Medium/Full Camera Link PCIe 2.0 x8 frame grabber with 4 GB DDR3 SDRAM, Xilinx Kintex 7 325T FPGA, and HDR26 (mini Camera Link) connectors. Includes cable adaptor for third and fourth GPIOs.

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