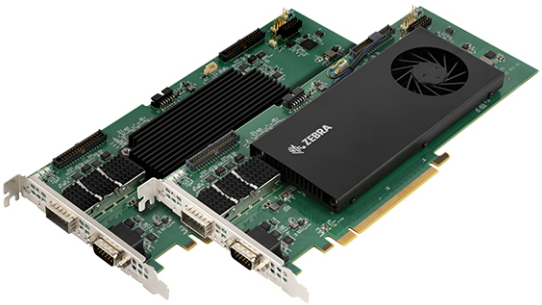
Rapixo CoF Frame Grabber

CXP-over-Fiber delivers speeds up to 100 Gbps

With the launch of the Rapixo CoF, Zebra introduces a CoaXPress-over-Fiber frame grabber supporting up to 100Gbps of throughput. This groundbreaking acquisition board leverages fiber optic technology to deliver unprecedented performance, reliability and flexibility for industrial imaging systems.



Zebra offers the Rapixo CoF in two models

- For high-performance applications, the Rapixo CoF Quad 10G provides high-speed fiber connectivity with a QSFP+ interface to deliver 40 Gbps aggregate bandwidth across four channels. The board also incorporates 4 GB of onboard memory and passive cooling.
- The Rapixo CoF Pro Quad 25G elevates performance further with QSFP28 connectivity supporting 100 Gbps aggregate bandwidth. It offers configurable 16 GB DDR4 memory, active thermal management and onboard FPGA processing capability for the most advanced image processing workflows.

By leveraging optical fiber technology, both models eliminate the risk of electromagnetic interference (EMI) inherent in copper wiring while enabling camera connections up to 250 meters without signal degradation. End users can expect robust, high-speed, flexible processing for challenging applications in semiconductor, electronics, and flat panel display manufacturing, pipeline inspection, infrastructure monitoring, surveillance, intelligent transportation systems and medical imaging—where performance and reliability are nonnegotiable.

Rapixo CoF: At a Glance

- Higher bandwidth—Achieve fiber-enabled transfer speeds up to 100 Gbps to support current and future high-speed CoaXPress 2.0 (CXP) cameras.
- Extended range—Connect cameras and PCs at distances up to 250 meters without signal degradation or additional amplification.
- Minimal noise—Eliminate EMI from your camera connection for cleaner signal transmission in electromagnetically noisy environments.
- Custom processing—Configure onboard FPGA capabilities using Zebra FDK software's component library and development tools.
- Flexible configuration—Support single cameras with four connections or up to four individual cameras per frame grabber.
- Event-logging utility—Monitor and troubleshoot acquisition performance in detail with Aurora Gecho event-logging utility.

Future-proofed for high-data-rate CXP cameras

As today's CXP 2.1 cameras incorporate larger sensors and deliver ever-higher performance, frame grabbers must adapt to accommodate increasingly high data rates. Zebra's Rapixo CoF supports up to 100Gbps over four 25Gbps channels. It offers higher data throughput and greater port density.

Configurable real-time edge processing

The Rapixo CoF Pro Quad 25G's dedicated FPGA processing capability enables real-time image preprocessing, filtering, and analysis directly on the frame grabber. Its advanced architecture reduces CPU load, minimizes memory bandwidth requirements and accelerates overall system performance by executing time-critical algorithms at the point of capture for applications requiring immediate decision-making. Zebra's FDK and AMD Vivado™ design software provide developers with comprehensive FPGA design components and pre-verified IP libraries to streamline custom application development.

EMI-resistant for harsh environments

The Rapixo CoF's fiber optic connectivity provides inherent electrical isolation between cameras and host systems, eliminating concerns about ground loops, lightning strikes or voltage spikes that can damage equipment or corrupt data. This isolation is particularly valuable in situations where electrical disturbances are common and equipment protection is critical—such as electromagnetically noisy settings involving high-power machinery or welding operations.

Embedded memory means no dropped frames

The Rapixo CoF Pro Quad 25G embeds up to 16 GB of onboard memory to tackle challenging applications, such as web inspections. Its ability to temporarily store and buffer image data helps eliminate dropped frames even when it's capturing high-resolution images at fast frame rates.

Multi-camera synchronization for complex imaging workflows

Rapixo CoF frame grabbers support up to four cameras to facilitate advanced applications like 3D imaging, multi-angle inspection and redundant monitoring systems. The frame grabber's precise timing control ensures synchronized capture across all channels, while its high-bandwidth fiber connections prevent data bottlenecks more typical of multi-camera copper-based systems.

Specifications

Rapixo CoF Frame Grabber	
Hardware	
Model	Rapixo CoF Quad 10G Rapixo CoF Pro Quad 25G
Model Number	RAP4G-4CF10-H RAP16-4CF25-P15F
Connectors	QSFP+ QSFP28
Speeds	10 Gbps (CXP-12) 25 Gbps (CXP-31)
PC Interconnect	PCIe Gen3x16
Acquisition Standard	CoaxPress-over-Fiber Bridge Protocol v1.1
GenICam Version	GenICam 3.4
Configuration	Four (4) connections in
Streams	Up to nine (9) total
Memory	
Quantity	4 GB 16 GB
Type	DRAM DDR4
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, 16 bit YCbCr, 32 bit BGRa
Custom Processing	N/A Zebra- or user-developed using AMD Vivado Design Suite and Zebra FDK
I/Os	
Types	Three (3) TTL I/Os per connector Two (2) LVDS inputs per connector One (1) LVDS output per connector Two (2) opto-isolated inputs per connector
External Connectors	One (1) HD15 connector on main I/O bracket Three (3) HD15 connectors on secondary I/O bracket (requires accessories)
Internal Connectors	One (1) 9-pin USB header One (1) 12-pin connector for inter-board synchronization

Environmental	
Cooling[1]	Passive[1] Active (fan)
Operating Temperature	0° C to 55° C (32° F to 131° F)
Relative Humidity	Up to 95% (non-condensing)
Target Certifications	
Electromagnetic Compatibility	FCC Class A CE Class A (EN55032, EN55024) ICES-003/NMB-003 Class A RCM Class A
Software	
Compatible Software	MIL (-Lite) X 24H2 with update 152 Aurora Imaging Library™ (Lite) X version 24H2 for x64/Linux
Operating System Support	Windows 10 22H2, Windows 11 23H2 Ubuntu 22.04 LTS (64 bits)
Physical	
Form Factor	Full height, 3/4 length PCIe x16 (version 3.1)
Dimensions (L x W x H)	24.99 x 1.871 x 11.15 cm (9.84 x 0.737 x 4.39 in)

1. Models with passive heatsink require a minimum ventilation of 150 LFM (linear feet per minute) in a single board configuration.

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