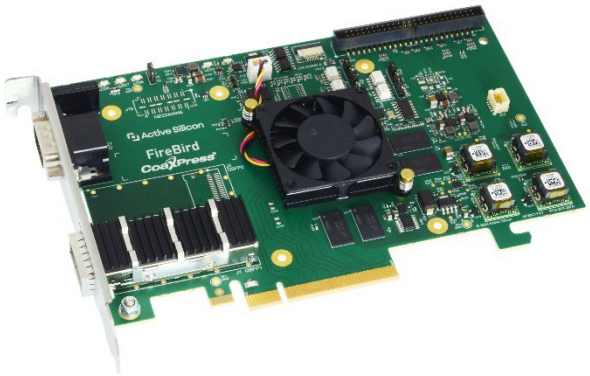
FIREBIRD COAXPRESS OVER FIBER
4xCOF-12 Frame Grabber

- CoaXPress-over-Fiber Frame Grabber
- Supports CoaXPress-over-Fiber speeds up to 4x 10.3125Gbps
- RISC based ActiveDMA engine technology
- PCI Express 3.0 (Gen3) 8-lane interface

CoaXPress® over Fiber

FEATURES

- CoaXPress over Fiber gives high speed data, and camera control all over a fiber optic cable.
- Using suitable optical transceivers cameras can be situated many hundreds of meters from the control PC
- One QSFP+ compliant port allows up to 40 Gbps of data.
- Fast PCI Express 3.0 (Gen3) 8-lane interface.
- ActiveDMA engine – acquisition with zero CPU usage.
- Comprehensive I/O including end bracket I/O.
- Standard half-length PCI form-factor.
- Full GenICam support (including GenTL Producer).
- Supported by the proven ActiveSDK.



OVERVIEW

The **FireBird CoaXPress over Fiber 4xCOF-12** frame grabber is a brand-new member of Active Silicon's state-of-the-art FireBird frame grabber family.

FireBird is designed for ultimate performance using Active Silicon's proprietary DMA Engine technology, "ActiveDMA". This technical innovation applies RISC based processor techniques and guarantees high speed and low latency image data transfers and zero CPU intervention.

CoaXPress over Fiber is an extension of the CoaXPress Machine Vision standard for high-speed imaging in professional and industrial applications. CoaXPress over Fiber allows the CoaXPress protocol to run over a fiber optic cable. The fiber optic cables and connectors needed for transmission are sourced from mainstream Ethernet technology (40 Gigabit Ethernet), this keeps their costs to a minimum and availability plentiful. Using fiber optics for communications has significant benefits where long cable runs are required, or cameras are placed in harsh electrical environments. With the correct choice of optical transceiver module, cameras can be placed multiple kilometers from the grabber.

Active Silicon was one of the primary authors of the international CoaXPress standard, which is hosted by the JIIA (Japan Industrial Imaging Association). CoaXPress over Fiber is an extension bridge protocol to the CoaXPress v2.1 specification.

FireBird is supported by Active Silicon's software development kit, ActiveSDK. This is available as a separate item and allows rapid system development and integration. It provides comprehensive example applications and optimized libraries and supports a variety of operating systems via a common API, including Windows, Linux (64-bit environments) and QNX. Drivers for third party applications are also available such as Cognex VisionPro, HALCON, Common Vision Blox, StreamPix, LabVIEW etc.

Full GenICam support is provided with the frame grabber drivers and this includes a GenTL Producer for data streaming as well as register accesses. Additional to functions that control the hardware, the libraries include general purpose functions for the manipulation and display of images. A separate datasheet describes ActiveSDK in detail.

SPECIFICATION SUMMARY

CoaXPress over Fiber Interface:	One QSFP+ transceiver cage. The 4xCOF-12 frame grabber supports: • Direct Attach Copper (DAC) cables (up to 1m in length) • 40GBASE-SR4 Optical Transceiver Modules – coupled with MTP/MPO connectors and OM3 optical cable the maximum cable length is 100m. • 40GBASE-SR4 Optical Transceiver Modules – coupled with MTP/MPO connectors and OM4 optical cable the maximum cable length is 150m. • 40GBASE-SR Active Optical Cable, the maximum cable length is 100m. • 40GBASE-LR Optical Transceiver Modules and a suitable LC-Duplex optical cable the maximum cable length is >2km. LEDs on the end bracket show the link status according to the CoaXPress over Fiber specification.
Buffer Memory:	Up to 4GBytes of DDR4 memory is fitted for buffering between the CoaXPress over Fiber interface and the PCI Express bus.
PCI Express:	PCIe 3.0 (Gen3) 8-lane interface to support up to 6.8 Gbytes/sec transfer from **FireBird** to the PC.
I/O:	The following I/O lines are available for triggers, optical shaft encoders, exposure control and general I/O: • 4 opto-isolated inputs. • 4 opto-isolated outputs. • 4 TTL inputs, 5V tolerant. • 4 TTL I/O, 5V logic. • 4 RS-422 inputs. • 4 RS-422 outputs. All these I/O signals are provided on a 50-way header on the **FireBird** board. A 15-way D-Type connector is located on the end bracket and allows access to a subset of the above I/O: • 2 opto-isolated inputs. • 3 TTL I/O, 5V logic. • 2 RS-422 inputs. • 1 RS-422 output.

CONFORMANCE

PCI Express Interface:	PCI Express Bus 3.0 (Gen3) 8-lane interface to Specification Revision 3.1, with a max payload size of 512 bytes. **FireBird 4xCOF-12 3PE8** supports both Short (32-bit) and Long (64-bit) Address packets. It also generates Posted Writes for image data, thus achieving transfer rates up to 6.8 Gbytes/sec, subject to host performance.	
CoaXPress:	**FireBird 4xCOF-12 3PE8** conforms to v2.1 of the CoaXPress specification, and CoaXPress over Fiber Bridge Protocol 1.0.	
Approvals:	EU	CE mark for compliance with EMC EN 55022:2010 (class A) and EN 55024:2010 in accordance with EU directive 2014/30/EU. RoHS compliance to RoHS3 directive 2015/863/EU.
	USA	EMC FCC Class A.
		The printed circuit board is manufactured by UL recognized manufacturers and has a flammability rating of 94V-0.

PHYSICAL AND ENVIRONMENTAL DETAILS

Dimensions:	PCB:	168mm by 69mm.
	Overall:	181mm by 69mm.
Approximate weight:	158g.	
Power consumption (typical):	+3.3 V	+12 V
(measured while acquiring from QSFP connection with 40GBase-SR optics)	TBA mA	TBA mA
Storage Temperature:	-15°C to +85°C.	
Operating Temperature:	0°C to +60°C (ambient environment).	
Relative Humidity:	10% to 90% non-condensing (operating and storage).	

ORDERING INFORMATION

PART NUMBER	*DESCRIPTION*
AS-FBD-4XCOF12-3PE8	**FireBird 4XCOF12** CoaXPress over Fiber frame grabber with four-lane QSFP+ interface and 8-lane PCIe 3.0 interface, supporting: High-speed QSFP (CoaXPress over Fiber) interface up to 40 Gbits per second line rate delivering 4x CXP-12 data payloads.
AS-FBD-4XCOF12-3PE8-DF	**FireBird 4XCOF12** CoaXPress over Fiber frame grabber with four-lane QSFP+ interface and 8-lane PCIe 3.0 interface, supporting: High-speed QSFP (CoaXPress over Fiber) interface up to 40 Gbits per second line rate delivering 4x CXP-12 data payloads. With second QSFP+ connector for data forwarding (Aurora, CoaXPress over Fiber formats) for daisy-chained data-processing applications
AS-ACTIVESDK-xxx	Software Development Kit for *xxx* operating system (xxx standing for WIN, LIN or QNX).
Cable Solutions	Fiber optic cable solutions are available (please contact sales).

THE FIREBIRD RANGE

The following products are also available in the range:

- High performance CoaXPress CXP-12 and CXP-6 frame grabbers in single, dual and quad configurations.
- Camera Link frame grabbers in Base, Medium, Full and 80-bit (Deca) configurations.

Active Silicon

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