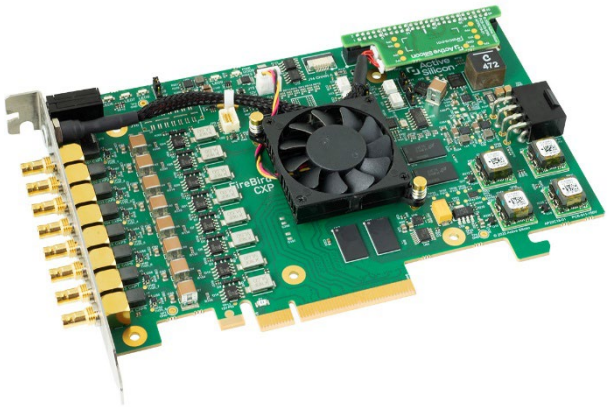
FIREBIRD COAXPRESS
Octal CXP-12 Frame Grabber with end-bracket I/O

- CoaXPress v2.1 Frame Grabber Family
- Supports CoaXPress speeds up to CXP-12
- RISC based ActiveDMA engine technology
- Eight CoaXPress connections
- PCI Express 3.0 (Gen3) 8-lane interface
- Subset of I/Os available from end bracket

FEATURES

- Designed for multi-CXP-6-camera systems
- CoaXPress gives high speed data, power, and camera control all over a single cable.
- High performance CXP 2.1 with up to 50 Gigabits per second input rate.
- Fast PCI Express 3.0 (Gen3) 8-lane interface.
- ActiveDMA engine – acquisition with zero CPU usage.
- Comprehensive I/O for triggers and lighting control.
- End-bracket I/O with choice of I/O subset.
- Supports PoCXP (Power over CoaXPress).
- Eight HD-BNC (Micro-BNC) connectors.
- Standard half-length PCIe form-factor.
- Full GenICam support (including GenTL Producer).
- Supported by the proven ActiveSDK.



OVERVIEW

FireBird 8xCXP-12 3PE8 IO Frame Grabber is a new addition to the 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, ensuring high-speed, low-latency image data transfers and zero CPU intervention.

CoaXPress is a leading transmission standard for high-speed imaging in professional and industrial applications, which includes the fast CXP-10 and CXP-12 speeds. Each CoaXPress connection supports up to 12.5 Gbps data rates, along with PoCXP for remote device power and device control at up to 42 Mbps –

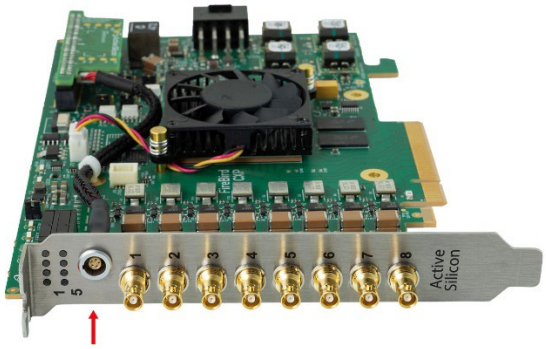
all on a single coax cable. For faster devices, connections can be concatenated to provide multiples of the single coax bandwidth. Very long cable lengths are supported – up to 40m at 6 Gbps and 100m at 3.125 Gbps using Belden 1694A cable – or even longer lengths using thicker cables.

Active Silicon was one of the primary authors of the international CoaXPress standard, which is hosted by the JIIA (Japan Industrial Imaging Association). All our CoaXPress products are certified compliant to the specification through the JIIA CoaXPress Product Certification Program.

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, which support a variety of operating systems via a common API, such as Windows and Linux (x86 and ARM, including NVIDIA Jetson). Drivers for third party applications are also available such as Cognex VisionPro, HALCON, Common Vision Blox, StreamPix, LabVIEW, MATLAB etc.

Full GenICam support is included in the 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 manipulating and displaying images. A separate datasheet describes ActiveSDK in detail.

This board is a variant of the **FireBird 8xCXP-12 3PE8**, only that a subset of the I/O is available right from the end bracket. The end-bracket I/Os are made accessible by a small Lemo connector (left image, red arrow) on the bracket. An optional adapter cable, Lemo to 15-way high-density D-Type connector (right image: board + cable), is available to translate signals to a Standard Active Silicon pinout.



SPECIFICATION SUMMARY

CoaXPress Interface:	Eight 75 Ohm HD-BNC connectors (also known as Micro-BNC) each operate at all CXP speeds up to 12.5 Gbps. Up to 68W of power is available to cameras across all the HD-BNC connections via Power over CoaXPress (PoCXP). **FireBird 8xCXP-12 3PE8 IO** board supports: Two cameras 4xCXP-6 connections Four cameras 2xCXP-6 connections (Future firmware updates will include support for one 8xCXP-6 camera and two 4xCXP-12 cameras in ping-pong mode – reading from one camera at a time) LEDs on the end bracket show the link status according to the CoaXPress specification.
Buffer Memory:	Up to 4 GBytes of DDR4 memory is fitted for buffering between the CoaXPress interface and the PCI Express bus.
PCI Express:	The PCI Express 3.0 (Gen3) 8-lane interface supports up to 6.8 Gbytes/sec transfer from **FireBird** to the PC.

I/O:	The following I/O lines are provided for triggers, optical shaft encoders, exposure control and general I/O, there are 4 different subset options available via the end-bracket I/O: A: 4x TTL Input or Outputs B: 2x RS422 Inputs C: 1x RS422 Input, 1x RS422 Output D: 2x Opto-isolated Inputs Should you require a custom set, please talk to our team. Should you require more I/Os, please look at our standard Octal frame grabber in combination with a 50-way header to 25-way D-type end-bracket adaptor (FireBird I/O Adapter Type 25D-A and FireBird I/O Adapter Type 25D-B).
Power Input:	An 8-way PCI Express Graphics (PEG) connector is provided to connect to a 6 or 8-way PEG connector from the PC power supply. This is only needed for PoCXP.
Fan Controller:	The fan speed is linked to the temperature of the FPGA die for optimum cooling and noise level.

CONFORMANCE

PCI Express Interface:	PCI Express Bus 3.0 (Gen3) 8-lane interface, with a max payload size of 512 bytes. **FireBird 8xCXP-12 3PE8 IO** 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 8xCXP-12 3PE8 IO** conforms to v2.1 of the CoaXPress specification.
Approvals:	EU CE mark for compliance with EMC EN 55032:2015 (class A) and EN 55035:2017 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 111mm. Overall: 181mm by 111mm.		
Approximate weight:	220g.		
Power consumption (typical):	+3.3 V	+12 V	+12V PEG Connector
(3PE8, measured while acquiring from 4xCXP-6 connections)	80mA	1320mA	Up to 68W for PoCXP
(3PE8, measured while acquiring from 8xCXP-6 connections)	80mA	1440mA	Up to 68W for PoCXP
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-8XCXP12-3PE8-IO-x	**FireBird 8xCXP-12 IO** frame grabber with PCIe 3.0 (Gen3) 8-lane interface and comprehensive I/O (incl. subset end-bracket I/O), supporting: • Two four-connection cameras up to CXP-6 • Four dual-connection cameras up to CXP-6 There are four end-bracket I/O subset options (x=A, B, C, D) available: **A:** 4x TTL Input or Outputs **B:** 2x RS422 Inputs **C:** 1x RS422 Input, 1x RS422 Output **D:** 2x Opto-isolated Inputs
AS-FBD-ADP-LMO-15D-x	Adapter cable: Lemo to 15-way high-density D-Type connector, (x=A, B, C, D, as above)
AS-FBD-8XCXP12-3PE8	**FireBird 8xCXP-12** frame grabber with PCIe 3.0 (Gen3) 8-lane interface and comprehensive I/O, supporting: • Two four-connection cameras up to CXP-6 • Four dual-connection cameras up to CXP-6
Software Solutions	
AS-ACTIVESDK-WIN	Software Development Kit for *Windows* operating system.
AS-ACTIVESDK-LIN	Software Development Kit for *Linux* operating system.
CoaXPress Cable Solutions	
AS-CBL-1MM-0010-xM	HD-BNC to HD-BNC cable *x* meters in length for use with CoaXPress video sources. Made from Belden 4855R cable rated to CXP-12. The standard stock length is 3m. High-flex rating and much longer length cables also available – contact your distributor for details.
AS-CBL-1BM-0010-xM	As above, but HD-BNC to BNC.
AS-CBL-1DM-0001-xM	As above, but HD-BNC to DIN1.0/2.3 and made from Belden 1855A cable rated to CXP-6 (DIN connectors are only supported in CXP up to CXP-6 speeds).

THE FIREBIRD RANGE

The following products are also available in the range:

- High performance CoaXPress CXP-12 frame grabbers in single, dual, quad and octo configurations.
- Optical link solutions with CoaXPress over Fiber.
- Camera Link frame grabbers in Dual Base, Medium, Full and 80-bit (Deca) configurations.

THE ONCILLA RANGE

Oncilla Machine Vision Computers are rugged industrial PCs with integrated frame grabber to provide a full vision solution for CoaXPress systems.

- Oncilla Machine Vision Computer – CoaXPress (4xCXP-3PE8)
- Oncilla Machine Vision Computer – CoaXPress over Fiber (4xCOF-3PE8)
- Oncilla Machine Vision Computer – Camera Link (1xCLD-2PE4)

Active Silicon

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