FIREBIRD COAXPRESS
Low Profile Frame Grabber

- CoaXPress Frame Grabber
- Low-Profile (half-height) PCIe form-factor
- One CoaXPress connection at 6.25 Gbps
- External I/O on front panel connector
- PCI Express 2.0 (Gen2) 4-lane interface

FEATURES

- CoaXPress gives high-speed data, power, and camera control all over a single cable.
- Competitively priced to offer a real-time alternative to GigE Vision (NBASE-T) and USB3 Vision.
- ActiveDMA engine – acquisition with zero CPU usage.
- Comprehensive I/O including front panel I/O.
- Supports PoCXP (Power over CoaXPress).
- HD-BNC (also known as Micro-BNC) connector.
- Half-length low-profile PCIe form-factor.
- Low-profile or full-height bracket options available.
- Supported by the proven ActiveSDK.
- Full GenICam support (including GenTL Producer).

OVERVIEW

FireBird Single CXP-6 Low Profile is a member of Active Silicon's state-of-the-art FireBird frame grabber family. This board has been optimized for cost-effectiveness and is ideal for use with the new small and affordable single connection CoaXPress cameras on the market. It combines competitive pricing with all the advantages of CoaXPress – higher bandwidths, longer cable lengths and the considerably higher reliability of a dedicated vision standard.

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 zero CPU usage, providing high speed and low latency image data transfers.

CoaXPress is a leading transmission standard for high-speed imaging in professional and industrial applications. The CoaXPress connection supports up to 6.25 Gbps data rates, along with device power up to 13W and device control at 20 Mbps – all on a single coax cable. Very long cable lengths are supported – up to 40m at 6.25 Gbps and over 100m at 3.125 Gbps. Active Silicon was one of the primary authors of the CoaXPress international 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, 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 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 the manipulation and display of images. A separate datasheet describes the ActiveSDK in detail.

The **FireBird Single CXP-6 Low Profile** can be purchased with either a full height PC card bracket for use in regular PCs or with a low profile PC card bracket to fit into small embedded PC enclosures and 2U rack mount cases.

With full-height bracket

With low-profile bracket

SPECIFICATION SUMMARY

CoaXPress Interface:	A 75 Ohm HD-BNC (also known as Micro-BNC) provides a connection operating at all CXP speeds up to 6.25 Gbps. Up to 17W is available to power cameras via Power over CoaXPress (PoCXP), with 13W available at the camera according to the CoaXPress specification. An LED alongside the HD-BNC shows the link status according to the CoaXPress specification.
PCI Express:	PCIe 2.0 (Gen2) 4-lane interface typically providing 1.7 Gbytes/sec transfer from **FireBird** to the PC, subject to PC performance.
I/O:	The following I/O lines are provided for triggers, 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 front panel 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.

Acquisition Control:	The acquisition control functionality is used to determine which video frames to acquire from the camera. The system can be configured for a single trigger event to acquire all subsequent frames, a trigger event per frame, or continuous acquisition irrespective of the trigger condition. The trigger event is programmable to be level or edge sensing via the control inputs (see the I/O section for more details) which can also be filtered to removed noise. Additionally, a delay block allows acquisition to be delayed by a defined time.
Trigger Control:	A comprehensive trigger control block allows triggers to be sent both over CoaXPress and to the control outputs (see the I/O section for more details). These triggers can be generated from the control inputs, an astable timer, and a software trigger. The selected trigger source can be filtered to removed noise, and can trigger monostable timers to provide defined width pulses, e.g. for exposure control or lighting control. Additionally, delay blocks allow the trigger to be shifted by a defined time. Additional modes interface to shaft encoders, including support for a quadrature encoder with the option to reject mechanical jitter from the encoder.
Region of Interest:	The Region Of Interest (ROI) feature controls which part of the output image to acquire. In areascan mode, this is a rectangular region with a programmable width, height and x / y offset. Linescan mode is similar, allowing control of the width and x offset, with the height control being used to package the data into pseudo frames for subsequent processing by the user's application.
Status LEDs:	Status LEDs are fitted to provide feedback on the camera connectivity and **FireBird** activity: Camera connectivity: • Camera connected / not connected. • Data transfer from camera. FireBird activity: • FPGA configuration. • PCIe access.

CONFORMANCE

PCI Express Interface:	PCI Express 2.0 (Gen2) 4-lane interface to Specification Revision 3.1, with a max payload size of 512 bytes. **FireBird Single CXP-6 Low Profile** supports both Short (32-bit) and Long (64-bit) Address packets. It also generates Posted Writes for image data, thus achieving transfer rates in excess of 1.7 GBytes/sec, subject to host performance. The board requires 16 MBytes of address space.	
CoaXPress:	**FireBird Single CXP-6 Low Profile** conforms to v1.1.1 of the CoaXPress specification. HD-BNC connector for CXP v2.1.	
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 recognised manufacturers and has a flammability rating of 94V-0.	

PHYSICAL AND ENVIRONMENTAL DETAILS

Dimensions:	PCB:	168mm by 69mm.
	Overall:	180mm by 69mm.
Approximate weight:	103g (with low profile PC card bracket) 107g (with full height PC card bracket)	
Power consumption (typical): *(Measured while acquiring at CXP-6 speed)*	+3.3 V 12mA	+12 V 375mA Plus up to 17W 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-1XCXP6-2PE4L-L	**FireBird Single CXP-6 Low Profile** frame grabber, low profile PCI Express form-factor with a low profile PC card bracket.
AS-FBD-1XCXP6-2PE4L-F	**FireBird Single CXP-6 Low Profile** frame grabber, low profile PCI Express form-factor with a full height PC card bracket.
AS-ACTIVESDK-xxx	Software Development Kit for *xxx* operating system. For a full list of all supported operating systems please refer to the SDK datasheet, or contact your distributor.
AS-CBL-1MM-0010-xM	HD-BNC (Micro-BNC) to HD-BNC cable *x* metres 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.

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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