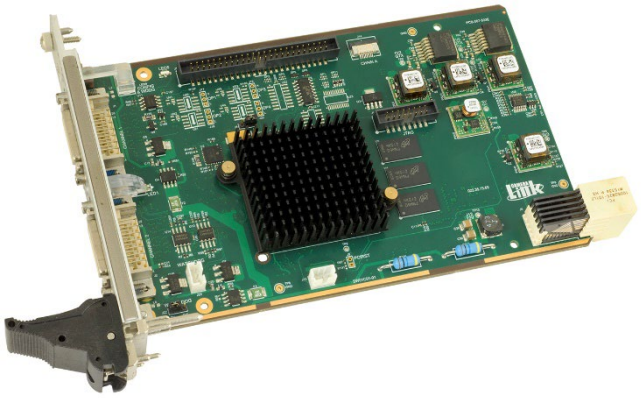
FIREBIRD CAMERA LINK

3U cPCI Serial Frame Grabber

- Camera Link Frame Grabber
- Supports Base, dual Base, Medium,
- Full and 80-bit (Deca) modes, with PoCL
- 3U CompactPCI Serial 2.0 (Gen2) 4-lane interface

FEATURES

- Supports the latest v2.1 Camera Link interface.
- Comprehensive I/O.
- Watchdog feature.
- Standard Camera Link connectors (MDR).
- Supports PoCL (Power over Camera Link).
- ActiveDMA engine – acquisition with zero CPU usage.
- 3U CompactPCI Serial form-factor.
- Extended temperature operation.
- Supported by the proven ActiveSDK.
- Supports GenICam for CLProtocol & GenCP cameras.
- Includes GenICam GenTL Producer.



OVERVIEW

The **FireBird Camera Link CompactPCI Serial** is a 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 zero CPU intervention, high speed and low latency image data transfers.

FireBird supports the latest version 2.1 Camera Link specification, including both 80-bit modes: 8-bit 10-tap and 10-bit 8-tap modes – often referred to as Camera Link "Deca", at clock rates of up to 85 MHz. The 4-lane Gen2 interface used on the **FireBird** is fast enough to cope with the full data rate that the Camera Link 80-bit interface can support. The **FireBird** also supports capture from two simultaneous Base Camera Link cameras as well as single Base, Medium and Full configurations.

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 runtime libraries, and is available for a variety of operating systems via a common API, including Windows, Linux and QNX. Drivers for third party applications are also available such as Cognex VisionPro, HALCON, Common Vision Blox, StreamPix, LabVIEW etc. As well as functions that control the hardware, the libraries include general purpose functions for the manipulation and display of images.

FireBird also supports GenICam for Camera Link cameras which support CLProtocol, including those using GenCP. A GenTL Producer is provided as part of the **FireBird** driver installation which allows the frame grabber to be used with GenICam GenTL compliant applications.

SPECIFICATION SUMMARY

Camera Link Interface:	**FireBird** is fitted with 26-way Camera Link connectors (MDR) and screwlocks as specified in the Camera Link v2.1 specification. LEDs by each connector show the link status, see Status LEDs for more details. The interface supports the following configurations: • Single Base. • Dual Base. • Single Medium. • Single Full. • Single 80-bit (Deca).
Camera Clock:	**FireBird** supports effective clock rates from DC to the Camera Link maximum of 85MHz, using the Camera Link Strobe (STB) and Data Valid (DVAL) signals.
PoCL:	**FireBird** supports Power over Camera Link (PoCL) functionality and is able to provide power to PoCL enabled cameras via the Camera Link data cable, therefore removing the need for a separate power supply. In addition to this the **FireBird** implements *SafePower,* an intelligent sense mechanism which detects the presence of a PoCL camera before applying power to it. This safety mechanism ensures that power is not applied to conventional non-PoCL cameras. **FireBird** can supply up to 4W at a nominal 12V to a Base mode PoCL camera, or 8W to a Medium/Full/80-bit camera, as required by the Camera Link specification. Both Camera Link connectors support PoCL, which with *SafePower* allows the use of any combination of PoCL and conventional cameras.
Buffer Memory:	320 Mbytes of DDR3 memory is fitted for buffering between the Camera Link interface and the PCI Express bus.
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, 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.
Watchdog:	**FireBird** is fitted with a hardware watchdog which monitors communication with the host. If the watchdog register is not written to within a certain period of time (e.g. suggesting the processor or software has failed in some way), an indication will be provided via an LED on the front panel. Whilst it is not possible to reboot / reset the processor across the bus, there is an open collector output that may be used for this type of purpose if required. There is also a jumper that when fitted disables the watchdog feature.

Acquisition Control:	The acquisition trigger 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). When running in linescan mode additional modes are available for interfacing to single output shaft encoders and quadrature encoders. The hardware can also delay the trigger event by a fixed time period or number of lines to allow fine tuning from sensor triggering to image acquisition.
Serial Port:	**FireBird** has an asynchronous serial port as part of the Camera Link interface which is used to communicate with the camera. In dual Base mode there is an additional serial port to communicate with the second camera. The serial port is controlled via the PHX API and is also accessible as a standard COM port in the host operating system.
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.
Data Mapper:	The image data can be formatted in hardware for ease of subsequent processing. For example, a mono data source can be converted into 32-bit color data for display. Supported output formats include 8-, 10-, 12-, 16- and 32-bit mono, as well as 24-, 32- and 48- bit color in both RGB and BGR ordering.
Status LEDs:	Status LEDs are fitted to provide feedback on the camera connectivity and FireBird activity: Camera connectivity: • Camera connected / not connected • State of the PoCL function (e.g. camera is powered via PoCL or external power). FireBird activity: • FPGA configuration. • PCIe access. Watchdog: • Watchdog status.

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 Camera Link CompactPCI Serial** 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.	
Camera Link:	**FireBird Camera Link CompactPCI Serial** conforms to v2.1 of the Camera Link specification.	
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:	160mm by 100mm.
	Overall:	Standard 3U cPCI Serial format.
Weight:	240g.	
Power consumption (typical)	+12V 500mA	Up to 4W per Camera Link connector may be supplied to power PoCL cameras.
	Measured during acquisition from a single 80-bit camera running at 85MHz (not including power to the camera).	
Storage Temperature:	-40°C to +85°C.	
Operating Temperature:	-40°C to +85°C (ambient environment).	
Relative Humidity:	10% to 90% non-condensing (operating and storage).	

ORDERING INFORMATION

PART NUMBER	*DESCRIPTION*
AS-FBD-1XCLD-3CPCIS-2PE4	**FireBird Camera Link 80-bit** frame grabber in 3U CompactPCI Serial form-factor.
AS-ACTIVESDK-xxx	Software Development Kit for xxx operating system. For a full list of all supported operating systems please refer to the ActiveSDK datasheet, or contact your distributor.
AS-CBL-CL-MPSP-y-xM	Camera Link cable *x* metres in length, Camera Link (MDR) to Camera Link Mini (SDR/HDR), suitable for both PoCL and conventional cameras. *y* indicates different cable type options. The standard stock length is 4m. High-flex rating and longer length cables are also available, as well as Camera Link (MDR) to Camera Link (MDR) cables – contact your distributor for details.

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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