



CoaXPress and Camera Link HS

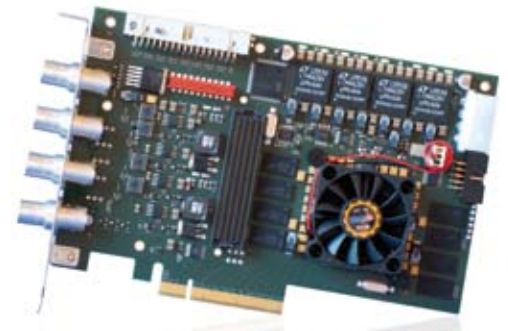
A „new generation“ interface standards for advanced, but easy-to-use Machine Vision systems

With the release of the Camera Link standard in 2000, the basis was defined for a fast data transfer between camera and frame grabber, which also met the high demands on the temporal and communication behavior. With the current generation of high resolution and high speed sensors, the definition on a high bandwidth was exceeded. A need of a succeeding standard became urgent.

With CoaXPress and Camera Link HS, two legitimate successors were specified that found the „next generation“ of high-speed applications. Both standards include recent technology developments and customer demands for comfort and ease of use in Machine Vision. With data bandwidth to 2.4 GByte/s, cable lengths over 100 meters, a power management over data cables, a highly accurate timing or even the simple handling and interoperability by the Gen<i>Cam software interface, the standards are not only the currently most powerful, but also the most flexible ones.

Nevertheless, the two standards differ in their technical focusses and designs. This makes it ideal to use their specific strength in applications. The synergy of both standards provides perfect solutions for mostly all professional requirements in Machine Vision and offers a wide range of products from a replacement of analog image processing technology up to the use in highest speed applications.

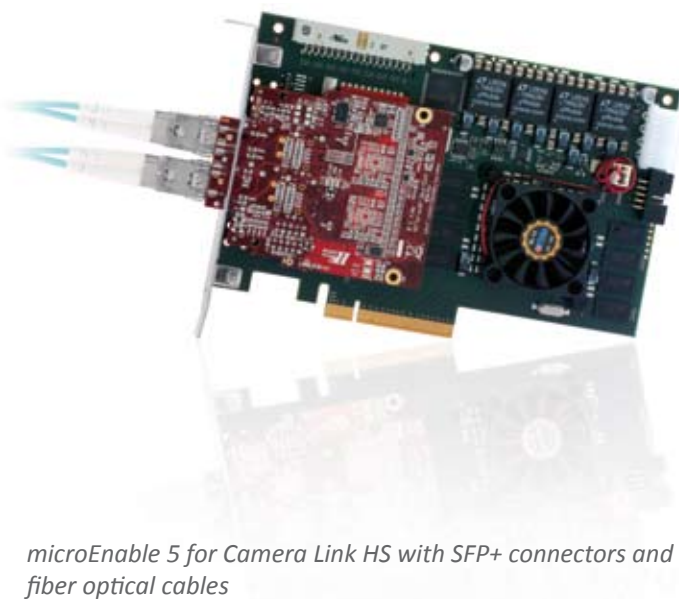
Silicon Software offers as one of the few manufacturers, a comprehensive product portfolio in the „new generation“ standards.



microEnable 5 for CoaXPress with BNC connectors

The brand new generation of frame grabber products, microEnable 5 was developed for CoaXPress and Camera Link HS. It is based on the PCI Express bus technology for the PC and is implemented with a PCIe x8 version 2.0 interface. To use the full bandwidth of the interface, Silicon Software has evolved the DMA3600 data transfer technology up to 3.6 GByte/s as a practical benchmark, which is slightly below the theoretical data transfer bandwidth of 4 GByte/s. Hereby the necessary maximum of 2.4 GByte/s is achieved for cameras with 4*CXP-6 transfer mode and additionally maintains reserves available for extended data bandwidth for on-board image processing or color reconstruction from CFA cameras (Bayer filter).

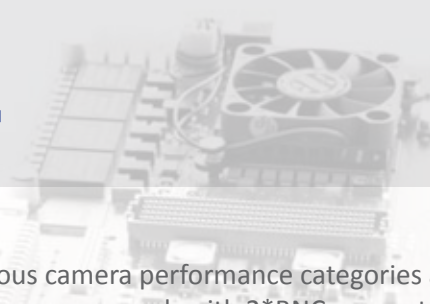
Silicon Software lines up very widely to support “new generation” cameras. Frame grabbers for the CoaXPress standard with four BNC connectors were designed that can achieve 600 Mbyte/s per input (CXP-6). The ports are back-



microEnable 5 for Camera Link HS with SFP+ connectors and fiber optical cables

Any information without obligation. Technical specifications and scope of delivery are liability-free and valid until revocation. Mistakes are excepted.





ward compatible (CXP-1, CXP-2, CXP-3, CXP-5) and can be operated with various camera performance categories and numbers (e.g. four single-port cameras with 1*BNC connector, two dual-port cameras, each with 2*BNC connectors, 1 quad-port camera with 4*BNC connectors and others). The specified maximum bandwidth of 2.4 GByte/s is achieved. In addition to the BNC connectors, the standardisation group also discusses the compact 5W5-plug. This footprint has been considered by Silicon Software's product development and will be offered after release of the succeeding specification and camera availability.



The Camera Link HS standard is close to its release. It defines both the CX4 connectors as well as the SFP + connector types as supported interfaces. While CX4 cables derived from the Infiniband development, a specification of a serial high-speed transmission technology, SFP (small form-factor pluggable) connectors are well known as small standardized module for network connections. SFP is a specification of modular optical and electrical transceivers. SFP modules fit in a SFF-slot, and are easily and quickly replaceable („hot-swap“). The line length of the optical connection is several hundred meters.

Silicon Software supports both connector definitions up to two CX4- or two SFP+-connectors.



One of the important criteria in the definition of both standards was a trigger behavior with very low latencies. Silicon Software offers its microEnable 5 boards with a high-performance trigger module for connecting external peripherals and processing general purpose data signals. The low latency signal processing is suited to the real-time behavior of the frame grabber. Especially for line scan camera applications, it is important to control the camera and image acquisition very accurately.

All products of microEnable 5-series based on a FPGA processor technology that guarantees high flexibility and a real-time behavior. The complete feature set is loaded via so called „hardware applets“ within microseconds, and offers besides essential application-specific functionality additional powerful features.

The proven concept of microEnable IV in offering A- and V-series boards will be continued with the microEnable 5 product line. The A-series models offer a robust, powerful image acquisition with essential pre-processing functions that are performed without any load of the host CPU. The V-series models also offer additional FPGA resources to integrate individual image processing. These functions can be programmed by users via VisualApplets, commissioned as a programming service or directly loaded from the off-the-shelves SmartApplets image processing libraries.

For the configuration of the frame grabber, a GenICam compliant software is delivered. It offers a cross-product possibility to parameterize frame grabber and system environment settings.

Available or planned models:

Standard / Frame Grabber	Description
Camera Link HS	
microEnable 5 CX4 models	up to 2-channels image acquisition and image processing boards
microEnable 5 SFP + models	up to 2-channels image acquisition and image processing boards
CoaXPress	
microEnable 5 CXP models	up to 4-channels image acquisition and image processing boards
microEnable 5 5W5 models	up to 4-channels image acquisition and image processing boards

Any information without obligation. Technical specifications and scope of delivery are liability-free and valid until revocation. Mistakes are excepted.

