

Introduction

The HSLink interface is a new machine vision connectivity interface pioneered by DALSA. DALSA is working with the Camera Link 2 subcommittee to bring reference designs and a more complete specification to the table for industry use as the next generation Machine Vision interface.

HSLink is designed specifically to meet the needs of all machine vision applications and therefore carries image data, configuration data and low jitter, real time triggering signals over a simple network topology supporting cameras, intermediate devices and frame grabbers. The interface has taken the key strengths of Camera Link™, and added new features and functions to meet the customer demands of today and tomorrow. HSLink is designed from a system point of view, ensuring the ability to create low cost cameras and frame grabbers, while meeting the ease of use, flexibility and data reliability demanded by end customers.

Features and Benefits of HSLink

- Globally available, off-the-shelf components are used. No license or royalty fees. No chip supply issues.
- Scalable bandwidths in 300MB/s steps from 300 to 6000 Mbytes/s, 1x to 20x configurations, while maintaining a common and consistent control interface and ease of implementation.
- Camera size is minimized.
 - Interface technology can be integrated into FPGAs rather than requiring a separate IC chip.
 - Power over HSLink is possible.
 - Protocol handles real-time triggering. No need for a separate trigger cable.
- Real-time triggering - low jitter of 3.2ns makes HSLink viable for linescan applications.
- Maintains the features of Camera Link, an industry specific connectivity solution, while using broadly-used, off-the-shelf components with development road maps for increased performance. This protocol will have a long service life.
- Lower cost data transmission across all bandwidths.
- Reliable data transmission achieved through redundant trigger codes, hardware resend capability, and proven technology. Hardware resend enables minimal buffer sizes suitable for inclusion in FPGAs, ie no external memory required.
- Plug and Play - Cameras are GenICam™
- General Purpose I/O are optional and supported on the camera
- Power optimized as the number of lanes needed for data transmission scales as necessary. Friendly to the environment.
- Data Forwarding - Low cost distributed image processing.
- Open development with feedback solicited and incorporated into improving the interface.
- Reference designs available to reduce implementation times.
- Designed to ensure longevity in the marketplace. Expected lifecycle is 10-20 years.
- HSLink Protocol - exceeding 95% video efficiency.

Functional Block Diagrams

The HSLink IP Core takes in Camera Link signals and priority manages trigger, GPIO image data and configuration data and sends this information to the PHY via GMII (Gigabit Media Independent Interface) and/or NBI (Nine Bit Interface). The HSLink IP core ensures guaranteed data delivery and simplifies design implementation in both framegrabbers and cameras. Multi-vendor PHYs, that operate on NBI and GMII, are available that serialize and de-serialize the data transmitted over the cable medium. For low bandwidth applications (<300Mbytes/s), Infiniband (IBx1) or Coax cabling offers a low cost solution. For applications up to 2100Mbytes/s, a single CX4 cable is used, which significantly reduces the size and number of cables required compared to today's machine vision standards, and still delivers 15m transmission distances.

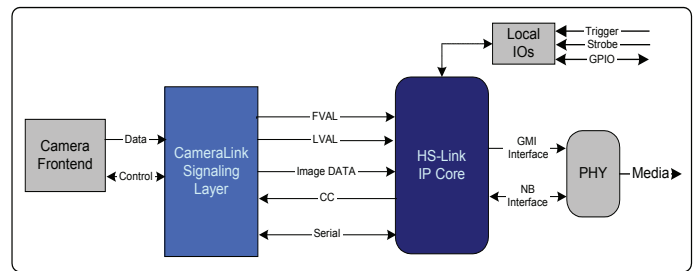
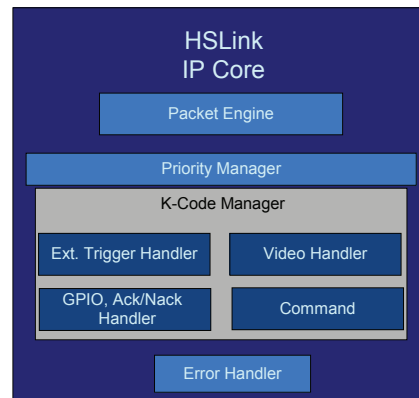


Figure 1 – Functional Diagram of HSLink from a Camera Perspective

HSLink IP Core



Technical Contact Name

If you want to be more participative or have any questions or feedback on HSLink, please contact:

Mike Miethig
 R&D Camera Development Manager
 DALSA Digital Imaging
 605 McMurray Road, Waterloo, ON, Canada N2V 2E9
 Tel: +1 519-886-6001 ext: 2130
 email: mike.miethig@dalsa.com
www.dalsa.com

Protocol Efficiency

