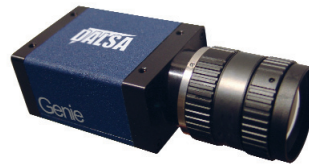


Vision at Work

Genie™



Digital Gigabit Ethernet Cameras

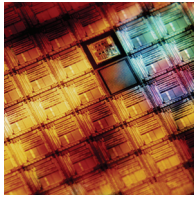
A Technology Primer

DALSA

GENIE CAMERAS - RELIABLE ACQUISITION

Genie cameras are affordable, easy to use digital cameras designed for industrial and medical image capture applications. Genie cameras combine standard gigabit Ethernet technology with DALSA's Trigger-to-Image Reliability™ framework to dependably capture and transfer images from the camera to the host PC. Featuring resolutions from VGA to 1600 x 1200, Genie cameras enable OEM's to quickly benefit from the advantages of digital camera technology.

THE DIGITAL ADVANTAGE



Digital camera technology delivers superior image quality enabling enhanced measurement accuracy. All image sensors generate charge which is analogous to the number of photons striking the sensor surface. These analog signals must be digitized before image processing and analysis can be performed on the resultant image. With analog cameras, this digitization occurs on a frame grabber, while in a digital camera the digitization occurs close to, or on, the image sensor. The benefits of in-camera digitization include; less noise induction through cables and thus better signal to noise ratios; superior image accuracy from a common sensor-A/D pixel clock; and enabling the use of standard digital connectivity between the camera and host computer.

THE GIGE VISION ADVANTAGE



Genie cameras are fully compliant with AIA's (Automated Imaging Association) GigE Vision Standard to directly link the camera to a PC.

Gigabit Ethernet (GigE) technology delivers a new paradigm to machine vision and imaging applications; among the advantages are longer cable lengths, lower costs, and simplified system setup. Using GigE, images are transmitted over standard, low-cost CAT-5e or CAT-6 cables which are widely available for networking applications. Furthermore, gigabit Ethernet cables can be up to 100 meters long, beneficial for industrial applications when the computer must be located far away from the camera head. Distances longer than 100 meters can also be achieved with the use of gigabit network switchers and routers. Additionally, by using industry standard networking components, commonly found as standard on many host computers, setting up an imaging system based on GigE is greatly simplified.

THE DALSA ADVANTAGE



OEM's in industrial imaging have been relying on DALSA to supply imaging components for over 25 years. Over that time the company has developed several arenas of expertise including the reliable acquisition of images, their treatment (processing) and their interpretation (analysis). Reliable image acquisition expertise is embodied in the company's Trigger-to-Image Reliability framework, and realized through the X64 series of industrial frame grabbers and Sapera™ Essential image acquisition and control software. Coupled with Sapera Essential, the X64 series has been successfully deployed in many high speed imaging applications including web and surface inspection, high speed motion analysis, and high frame rate industrial inspection.

TRIGGER-TO-IMAGE-RELIABILITY



TRIGGER TO IMAGE RELIABILITY

Trigger-to-Image Reliability is a design framework that ensures the reliability of the image acquisition system and as such it provides the following benefits; improved image acquisition quality; higher yields due to increased uptime and continuous image acquisition process management; promotes innovation

by enabling developers to focus on core image processing logic for their own domain. Trigger-to-Image Reliability contributes to efficient machine vision system design and operation by supplying the key design elements needed to: 1) secure the image acquisition process, 2) permit error identification, and 3) provide a recovery mechanism when errors do occur. Trigger-to-Image Reliability is important because it enables vision experts to use a wide variety of device platforms to quickly create compelling solutions to deliver the best price/performance ratios in their market segments.

GENIE CAMERAS



The DALSA Genie cameras are compact, rugged digital cameras designed specifically for industrial imaging applications. Their compact size allows easy integration into most image processing systems. The cameras are based on high quality, highly sensitive CCD and CMOS sensors and are available in variety of resolutions ranging from VGA to 1600 x 1200 in both color and

monochrome. Color Genie cameras feature white balancing and advanced Bayer conversion to produce crisp and accurate color images.

Genie Camera Features

All Genie cameras feature value added functionality designed specifically for imaging and machine vision applications. All features are easily accessible from DALSA's Sopera Essential and CamExpert to deliver superior image capture performance to OEM's.

Global Shutter

Image quality is critical for machine vision applications, a requirement made complicated by the fact that objects being captured are rarely motionless. Genie cameras utilize sensors with global shutter to ensure the entire sensor is exposed at exactly the same time, eliminating any image blur due to motion.

Partial Scan

For applications that require a faster frame rate, Genie cameras support partial scan modes. In partial scan mode the number of horizontal lines is reduced as the vertical scan rate is increased. This permits the capture of objects at rates faster than the standard frame rate of the sensor.

Triggered Capture

Genie cameras feature several modes of image capture control. Image capture can be free-running, or can be synchronized to external events through hardware (an external input), an internal timer or through software. For instantaneous object capture, all Genie cameras support asynchronous reset.

Lookup Tables (LUT)

Genie cameras feature lookup tables for both color and monochrome sensors. The LUT can be dynamically loadable and are fully user programmable. The lookup tables can be used for image thresholding, gamma correction or basic pixel format conversion, simplifying subsequent image processing steps.

Real-Time Shading Correction

To overcome image artifacts caused by non-uniform illumination Genie cameras feature real-time shading correction. The shading correction engine is user configurable and comes bundled with a calibration utility to generate gain and offset pixel maps.

Image Buffers and Image Sequences

Genie cameras feature internal buffer memory that can be used to store captured images and image sequences before they are transmitted over the gigabit Ethernet network. Internal buffer memory is part of the Trigger-to-Image-Reliability framework that ensures reliable and repeatable image capture and transmission.

I/O

Genie cameras feature a convenient set of I/O's: 2 opto-isolated inputs (including a camera trigger) and 2 outputs using solid-state relays (including a strobe), permitting local control over image acquisition and activation.

Visual Status LED

For easy setup and use, Genie cameras feature visual status LEDs, mounted on the cameras back to simplify system installation and setup. A status indicator LED provides visual feedback when the correct camera connection is made and when a grab is in progress. These visual indicators allow developers to instantly recognize if cabling has been correctly set up greatly facilitating the diagnostic process.

SOFTWARE SUPPORT**Image Acquisition Processing and Analysis**

Genie cameras are supported by DALSA's Sapera™ Essential machine vision software. Sapera Essential is a value-add machine vision software imaging toolkit that bundles image acquisition and control with image processing tools to provide developers with the critical functionality to design, develop and deploy high-performance machine vision systems.

Sapera Essential offers quick and easy access to software functions to control image acquisition, manage image memory and facilitate image processing and analysis tasks. Sapera Essential includes a powerful board configuration and camera set-up utility plus a suite of image processing tools including a highly advanced, yet cost effective, geometric Search package that supports both area and edge-based pattern finding, a versatile Barcode tool for both 1-D and 2-D decoding, and a Blob Analysis capability for defect detection.

EASE OF USE AND SETUP

For easier system setup, as soon as a Genie camera is connected to the system, it is automatically identified and supported feature sets are communicated to the Sopera Essential environment (auto discovery). Camera setup and configuration is performed using CamExpert (which is also used to configure and use third party cameras and the company's frame grabbers). Genie cameras also feature an embedded test image to ensure the network viability and simplify system setup.

GENIE CAMERA MODELS* (C=Color/M=Monochrome)

| Camera | Sensor Size (inches) | Resolution | Pixel size (µm) | fps |
|----------------|----------------------|-------------|-----------------|-----|
| Genie M640-1/2 | 1/2 | 659 x 494 | 9.90 x 9.90 | 60 |
| Genie M640-1/3 | 1/3 | 659 x 494 | 7.40 x 7.40 | 60 |
| Genie M1024 | 1/3 | 1034 x 779 | 4.65 x 4.65 | 30 |
| Genie M1400 | 1/2 | 1392 x 1040 | 4.65 x 4.65 | 15 |
| Genie C640-1/3 | 1/3 | 659 x 494 | 7.40 x 7.40 | 60 |
| Genie C1024 | 1/3 | 1034 x 779 | 4.65 x 4.65 | 30 |
| Genie C1400 | 1/2 | 1392 x 1040 | 4.65 x 4.65 | 15 |

*Note that some camera models are planned for future release. Contact a DALSA camera specialist for a list of currently available models and for detailed product specifications. Visit our web site at www.imaging.com

Specifications subject to change without notice

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