

# Quality + Compression

## Enhanced Image Quality



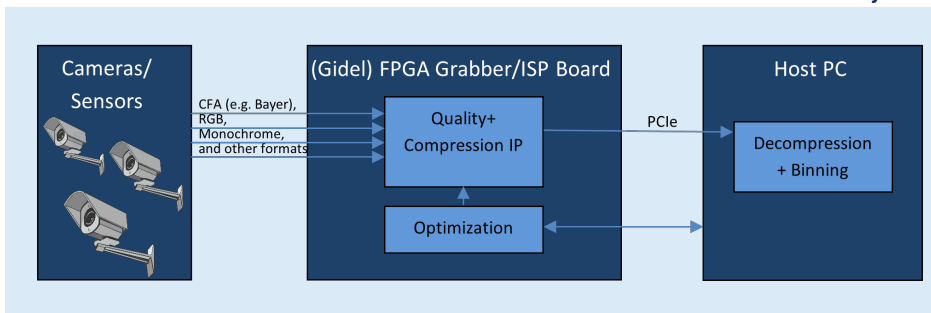
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### Key Features

- Real-time compression of Color Filter Array (e.g., Bayer), RGB, Monochrome images. For other image formats, contact Gidel.
- Image enhancement - improved signal to noise ratio (SNR) in comparison to original image.
- Compression of camera rates beyond 1.2 Giga pixel/s
- IP for FPGA based frame grabbers
- Supported by Gidel's reconfigurable acquisition flow enabling custom grabbing and adding compression and ISP blocks
- Supported by the Gidel InfiniVision IP for acquisition from multi-cameras/sensors
- Supported by the ProcVision Suite for efficient development of Vision/Imaging design on FPGA
- Compression optimization based on training using sample data
- Option for on-the-fly optimization using real-time training algorithms
- Decompression software with latency of less than one frame period
- Binning option to increase decompression rate by image resize
- Option for software model for compression simulations

### Target Applications

- Recording Systems
- Broadcasting and Video
- Smart Cities
- Surveillance
- Autonomous cars



Gidel's Quality+ (**Q+**) IP, targeting FPGAs, performs compression for Color Filter Array (CFA - e.g., Bayer), Monochrome, and RGB images and videos. **Q+** offers a market unique solution for real-time compression of high-bandwidth image streams to achieve compression ratios as high as 1:20 while improving the quality of the image in comparison to the original image. How is this possible? Gidel's patented FPGA based algorithms use training to optimize both spatial and temporal compression. **Q+** improves the image's signal to noise ratio (SNR) by removing artifacts and noise that degraded the original image quality. The final decompressed images appear sharper than the original images!

FPGA	Line size	Bit/pixel	Throughput
Arria 10 (slowest device)	6K	8	1.2G Pixels/Sec

### Typical Compression Performance

The IP enables compression of multi-cameras/sensors at pixel clock rate exceeding 1.2 Giga pixel/s while utilizing minimal FPGA resources and low power consumption.

With Gidel's comprehensive eco-system, the developer can tailor optimized Vision and Imaging solutions that include custom acquisition flow, image processing, **Q+** compression, and a recording system. Recording systems may also be complemented by Gidel's CamSim playback system.

The IP is supported by a decompression software enabling:

- Full streaming rate with a latency of less than a single frame period.
- Binning option to reduce image size and processing time. This feature, for example, can be used for displaying videos from multi cameras during a recording session.



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## Gidel's Supporting Eco-System

The Gidel eco-system includes infrastructure and development tools enabling to quickly develop a high-end custom FPGA frame grabber with real-time compression and image processing capabilities. The eco-system includes:

- ***FPGA Frame Grabber and Image Processing Systems***

Gidel offers FPGA-based systems with open reconfigurable acquisition flow allowing the user to customize the grabbing and to add user image processing blocks, including the compression IP. The Gidel frame grabbers and edge computers interface with the host computer via the PCIe or alternatively may operate as a standalone system.

- ***Multi-Camera Acquisition System***

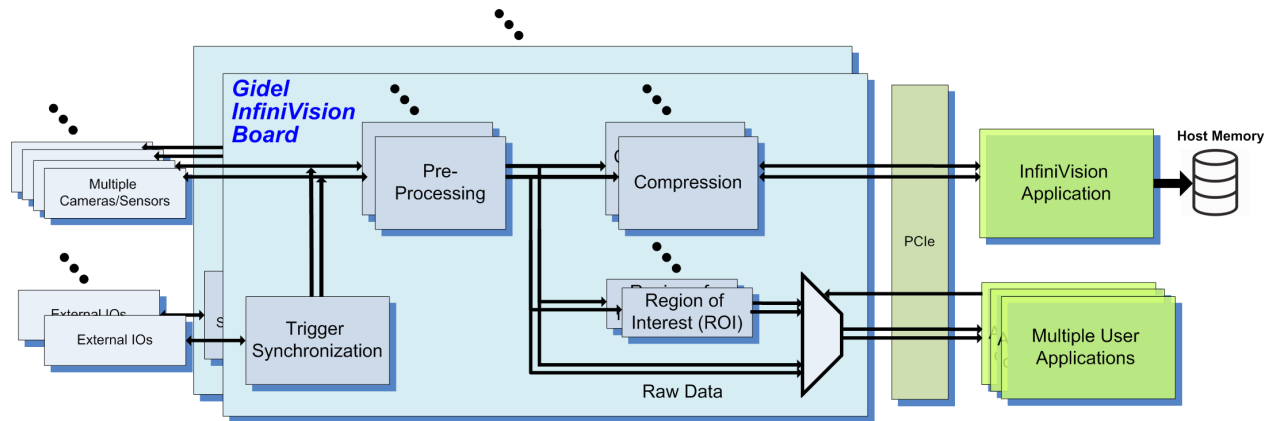
The Gidel InfiniVision is a unique image acquisition system designed for grabbing from multi-cameras/sensors. Combined with real-time compression, as much as 100 camera video streams can be supported simultaneously.

- ***Highly Efficient Video Recording & Playback Systems***

Based on real-time compression, Gidel offers a recording system that is exceptionally efficient in both its offloading throughput and compactness of required memory resources. This capability has significant benefits for applications with demanding bandwidth and/or memory resources, e.g., field applications. Based on Gidel's CamSim a playback sub-system, images can then be retrieved at the original throughput for a variety of application tasks.

- ***ProcVision Developer's Suite***

The ProcVision suite enable to map the FPGA board to the desired data flow and interfaces. The following figure demonstrates one possible implementation using InfiniVision, compression and custom image processing.



- ***Gidel Customization Services***

Based on over 30 years experience, Gidel offers customization services for developing tailored Vision/Imaging systems according to the customer's specifications. Gidel takes advantage of its uniquely flexible and powerful infrastructure and its innovative development tools to quickly implement the target application within impressive short time spans.