

## QOI Image Compression IP Cores available from CAST and Ocean Logic

*Hardware codecs for this new lossless compression format offer satisfactory compression ratios but are significantly simpler, smaller, and faster.*

**Woodcliff Lake, New Jersey — May 20, 2022** — Semiconductor intellectual property provider CAST today announced the availability of IP cores implementing hardware encoders and decoders for lossless image compression using the QOI (Quite Okay Image) format.

Sourced from Ocean Logic, the QOI Encoder and QOI Decoder cores work with 24-bit RGB or 32-bit RGBA images or streams of images in video applications. They are remarkably hardware efficient, compressing or decompressing images at rates sufficient for UHD 4k30 video even in low-end FPGAs, 4k60 in mid-range FPGAs, and 8k30 or 60 in modern ASIC technologies.



The key to the cores' competitive performance lies in the QOI format itself.

Dominic Szablewski [invented QOI in late 2021](#), achieving his goal of compression ratios similar to that of PNG but much faster and with dramatically less computational complexity. As he wrote:

“There absolutely is a market for video, audio and image codecs that trade compression ratio for speed and simplicity, but no one is serving it.”

Running several [benchmarks](#), Szablewski found lossless compression with QOI runs 20–50 times faster and decompression 3–4 times faster than PNG (for the 24-bit RGB and RGBa QOI accepts). With generally positive feedback from the compression community, Szablewski made QOI open source, and the new format has already been integrated into several software codecs and image viewing tools.

Noting the blazing speed with good enough compression ratios but extreme simplicity, video compression expert (and long-time CAST partner) [Ocean Logic](#) developed reusable ASIC or FPGA IP cores implementing a hardware encoder and decoder for

QOI. As described in this [white paper](#), Ocean Logic also improved the QOI compression ratio up to ~15% by scanning natural images along a [Hilbert curve](#) instead of the normal raster order. This improvement can be included in the new IP cores on request.

These cores are now available through and supported by CAST. The [QOI Encoder Core](#) and the [QOI Decoder Core](#) each use just 15,000 ASIC gates, have an extremely high throughput rate—processing one pixel each clock cycle—and can run at frequencies higher than 1GHz in most modern ASIC technologies.

Though limited to RGB and RGBA images with 8 bits per color, the company believes numerous applications will benefit from the tiny silicon and fast performance of the QOI cores. These include:

- frame buffer or display graphics compression in a variety of video processing or display-driving SoCs, and
- image storage and transmission for medical and aerospace systems.

The CAST engineering team is prepared to help system developers explore the benefits of the new QOI IP for their own products; contact CAST at [info@cast-inc.com](mailto:info@cast-inc.com) to start the discussion.

## About CAST

Computer Aided Software Technologies, Inc. (CAST) is a silicon IP provider founded in 1993. The new QOI codec cores are part of CAST's extensive line of image, video, and data compression engine IP. CAST's ASIC and FPGA IP product line also includes RISC-V and other microcontrollers and processors; interfaces for automotive, aerospace, and other applications; various common peripheral devices; and comprehensive SoC security modules. Learn more by visiting [www.cast-inc.com](http://www.cast-inc.com).

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