UHT-JPEG-E
Ultra High Throughput JPEG Encoder Core

Implements an advanced 8-bit Baseline and 12-bit Extended Sequential DCT JPEG encoder, compliant to the ITU T.81 and ISO/IEC 10918-1 standards. Featuring a scalable architecture able to process up to 32 samples per clock cycle, the UHT-JPEG-E core is designed to enable ultra high frame rate SD and HD encoding, and Ultra HD (4K/8K and beyond) video encoding, even in low-end ASIC or FPGA silicon.

The encoder core is able to process all popular input formats, and it outputs complete JPEG byte streams, which are decodable by any standard-compliant decoder and suitable as JPEG payload in Motion-JPEG streams. The UHT-JPEG-E allows regulation of either the JPEG’s quality factor, or the output stream bit-rate. Under the Constant Bit Rate (CBR) mode of operation, the core is suitable for a wide range of video streaming applications; it allows real-time control over the compression ratio as well as the end-to-end latency, via regulation of the transmission of buffer size.

The UHT-JPEG-E is easy to use and integrate. It requires minimal host intervention, as it only needs to be programmed once per video sequence. Once programmed, it can encode an arbitrary number of video frames without the need of any further intervention or assistance by the host system CPU. Streaming interfaces for the pixel and compressed stream data, a microprocessor-like interface to its registers, and optional AMBA AHB or AXI bus wrappers ease the SoC integration. Even more importantly the low-bandwidth external memory interface is independent of the memory type and can work with on-chip SRAMs or off-chip DDR memories, and is tolerant to latencies, which makes it suitable for share-memory architectures.

The UHT-JPEG-E has been designed for reuse, following proven practices that ensure trouble free implementation, technology mapping and verification. The core is available in RTL source code or as a targeted FPGA netlist.

Applications
The minimal silicon and memory resources make the Ultra-High Throughput JPEG encoder ideal for high-frame rate ED or HD, or Ultra-HD and Beyond UHD video compression, in a variety of applications including: professional cameras, office automation equipment, medical/industrial/scientific imaging, surveillance and video conferencing.

Block Diagram