VC-2 High Quality video codec

Lightweight Video Compression IP core

**Low Complexity ASIC and FPGA**

Ultra-Low Latency
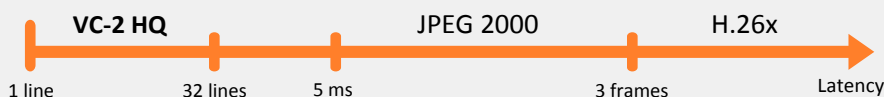
SMPTE ST 2042 Patent free

Visually or Math Lossless

The VC-2 HQ codec is defined in the SMPTE ST 2042 standard. The high quality profile and low delay syntax of VC-2 is used to achieve low compression ratio, typically up to 4 times visually lossless. The algorithm is lightweight and works without external memory allowing cost-effective implementation. The VC-2 High Quality codec has ultra-low latency due to its line-based processing.

Best trade-off between quality and complexity

VC-2 HQ	JPEG 2000	H.26x

1:1   4:1   20:1   Compression ratio
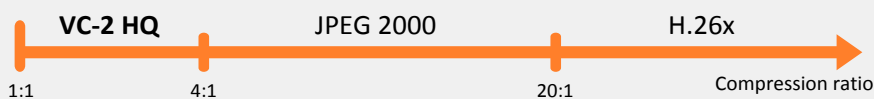
End-to-end Latency: encoding + decoding

VC-2 HQ	JPEG 2000	H.26x

1 line   32 lines   5 ms   3 frames   Latency

BARCO
Visibly yours

Video Transport over IP networks

Visually lossless and low latency video networking on 1G and 10G Ethernet

VC-2 HQ can be used to efficiently transport video streams over an IP network. Several channels of high resolution/frame rate can be encoded and transmitted over the same IP network. Infrastructure based on 1 Gbps or 10 Gbps can be used depending on the bandwidth of the video streams to transport. The constant bitrate compressed stream can be mapped to RTP packets according to the IETF RFC. VC-2 HQ can be used for compression and RTP transport according to VSF TR-03.
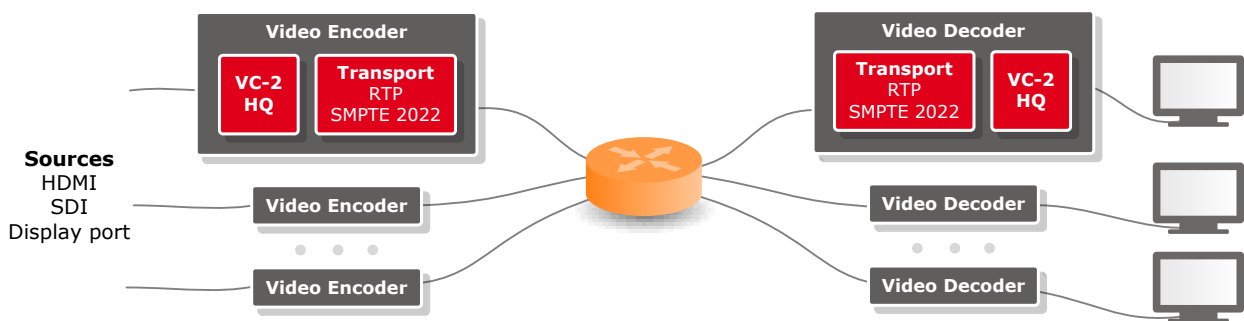

- Ultra-low latency
- High quality and visually lossless
- Low-cost encoder/decoder

- Standardized RTP mapping
- HD channels over 1G
- UHD channels over 10G

High Resolution video over SDI cabling

Transport 3G-SDI video signals over HD-SDI with the SMPTE 2047 standard

The SMPTE 2047 standard defines how to transport 3G-SDI content over a less expensive HD-SDI cable. Similar can be done with high resolution UHD/4K content over a single 3G-SDI cable. This enables reuse of the current SDI infrastructure for future 4K content. The VC-2 HQ codec is resilient to multiple encoding and decoding of the same content without degrading the video which is essential during broadcast production. The SDI signal containing the VC-2 stream can be mapped to SMPTE 2022-6.
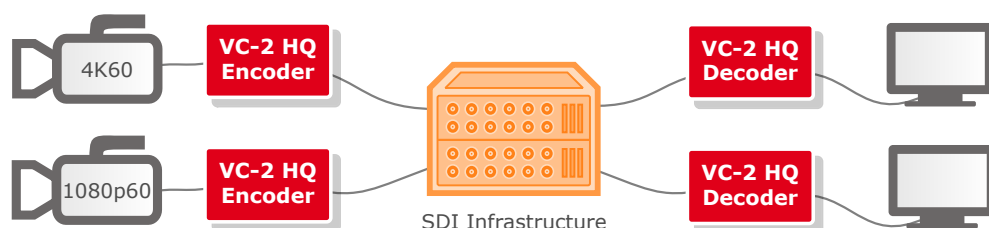
Camera sensor encoding with VC-2 HQ

Encoding of high frame rate and high resolution images

Industrial and military camera can have very different sensors (resolution, color, frame rate), but higher quality always brings more data to read out from the camera. The VC-2 HQ can lower the bandwidth of the video content and its storage space. A software decoder can be used to process and visualize the content on a server or workstation.
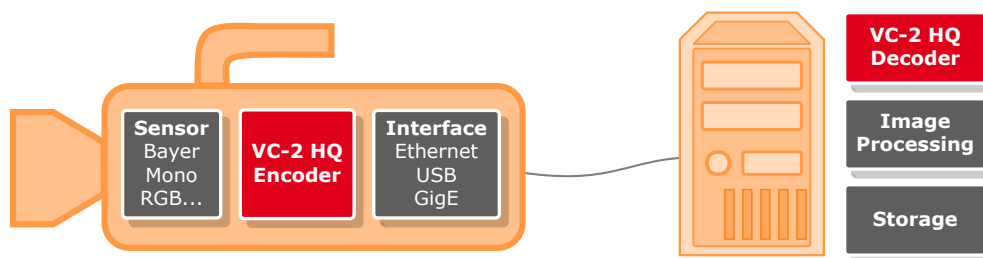
Sensor Bayer Mono RGB…	VC-2 HQ Encoder	Interface Ethernet USB GigE

VC-2 HQ Decoder

Image Processing

Storage

Image and video storage with VC-2 HQ

Optimize data bandwidth and storage with lightweight compression

Storage of video and images requires high bandwidth to the storage medium, and also a lot of space. The VC-2 HQ codec will reduce the bandwidth on the interface and avoid bottleneck while maintaining top quality. It can be used for temporary buffering such as DDR memory, or permanent storage such as disks in data centers.

MOVIE

IMAGE

VC-2 HQ Codec
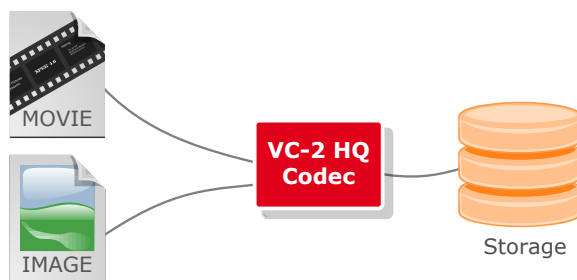
Storage

- Any storage (DDR, Disk,…)
- Save bandwidth and space
- Visually lossless up to 4 times
- Mathematically lossless for archiving

Open source software libraries

VC-2 HQ real-time software encoding/decoding and transport

- VC2HQDecode: real-time software decoder library for VC-2 High Quality
- VC2HQEncode: real-time software encoder library for VC-2 High Quality
- gstRTPvc2: GStreamer RTP Mapping plugin for VC-2
- FFmpeg: FFmpeg 3.0 with integrated VC-2 codec.

VC-2 High Quality video codec
Product sheet

Technical features

The VC-2 High Quality codec is compliant with SMPTE ST 2042-1:2012:

- High Quality profile, Low Delay syntax
- Available for ASIC and FPGA

Special features:

- 2-pixel interleaved video interface for UHD
- Resolution scalability
- Partial decoding of an area of the image

The core supports the following video parameters and encoding modes

- Unrestricted resolution including SD, HD, 2K, 4K, UHD, UHD-8K
- 4:4:4, 4:2:2 and 4:2:0 color subsampling
- Interlaced and progressive formats
- From 8 up to 16 bits per pixel component (HDR Ready)
- Haar0, Haar1 and LeGall Discrete Wavelet Transform (DWT) with depth of 1, 2 and 3
- Lossless and constant quality variable bit-rate encoding (VBR)
- Constant bit-rate encoding (CBR) with adjustable compression ratio
- Capped VBR encoding with maximum slice size

Viper: OEM board for 4K HDMI transport over IP network

The Viper boards from Barco Silex are fully integrated boards that enable the development of ultra-low latency audio/video over IP products. The video stream is compressed with VC-2 HQ and enables up to 4K 30fps over a single 1G Ethernet cable.

Other video compression IP cores

- JPEG2000 encoder and decoder for many types of applications in broadcast, digital cinema, surveillance,…
- JPEG encoder and decoder for color/monochrome still or video images.
- MPEG-2 decoder for high performance multichannel systems.

For more information, please contact us.

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