Trilinear

Display Stream Compression

DSC ENCODER

The Trilinear Technologies Display Stream Compression (DSC) Encoder offers real-time compression of high-definition streams with resolutions up to 8K. The core supports 8, 10, 12, 14 or 16 bits per pixel input using either RGB or YCbCr in 4:4:4 or 4:2:2 format. The DSC Encoder core integrates industry standard interfaces for host configuration and control, video input, and output.

AT A GLANCE:

- Capable of decoding up to 4K video at 30fps in FPGA and 8K video at 30fps in ASIC applications
- Low gate count and low latency implementation
- Three clock domains:
  - Stream and APB clocks operate the applicable interfaces
  - Independent decoder clock runs the core functions
- Fully compliant with the VESA DSC 1.2a standard
- Uses synchronus design techniques and a technology abstraction layer for internal SRAM buffers
- Allows for migration from FPGA or FPGA prototype to ASIC with no functional changes to the core
- Completely pipelined; can be stalled as necessary to properly manage input and output rates

Host

32-bit AMBA Peripheral Bus 4 (APB) slave interface for programming and control. All internal configuration and status registers are accessible from the slave APB interface.

Input

Parallel streaming interface with VSync and HsSync support for image framing.

Output

AXI4-Stream Protocol interface is implemented to support the transfer of encoded data.

Performance & Area

The DSC Encoder implementation includes best-in-class design processes and is efficient in resource usage and operating frequency. The core requires less than 250K gates in the TSMC 28HP process, and a 175MHz core clock performs 4K encode. For detailed information on area and timing, please contact Trilinear Technologies with the specific technology platform required.

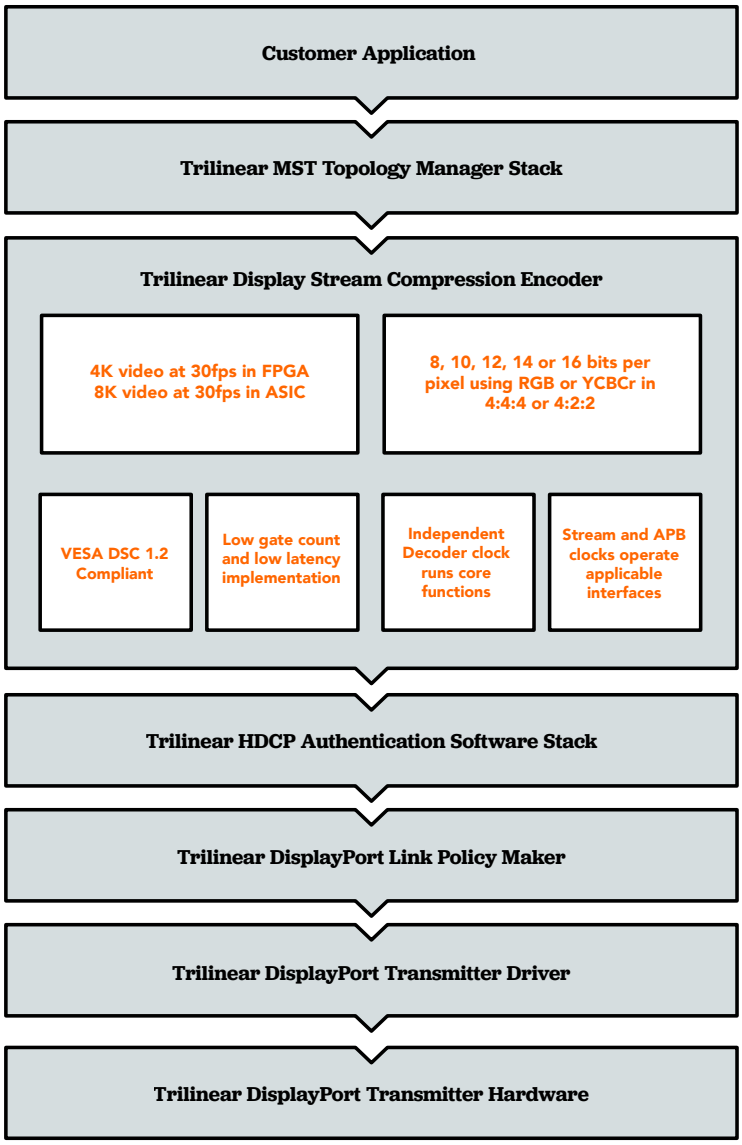

Figure 1. Trilinear Display Stream Compression Encoder

Delivery & Availability

The DSC Encoder is currently available as a soft core in one of several configurations for both FPGA and ASIC implementations. The core includes a complete 'C' reference driver, fully documented software API, and stream encoder sample application. Customers may select from off-the-shelf versions of the core or a version with customized interfaces. Custom host processor and memory interfaces may be requested at no additional charge.

The core is also available on the Trilinear Technologies' Cobra Development platform based on the Xilinx KC705. This FPGA-based reference system provides a complete development environment for core evaluation as well as early software development.

Verification Testing

Verification testing for the DSC Decoder is fully compliant with the VESA DSC 1.2a specification; it has been thoroughly validated using the VESA software model as the golden reference. Trilinear Technologies completed extensive interoperability testing with 3rd party reference models and test suites, along with the reference hardware using a variety of shipping encoder products. The core has also been verified in conjunction with the Embedded DisplayPort 1.4b Transmitter design. Hardware validation was performed using eDP-compliant sink devices.

The core ships with a self-checking test bench to illustrate the proper management of the input and output interfaces. The test bench environment is extensible and can be used to implement customer-specific test scenarios.

Design Database

Trilinear Technologies delivers an extensive design database for the DSC Encoder core. The database includes all of the files required to implement the design on multiple platforms, including FPGA and ASIC technologies. In addition to the core implementation files, delivery includes reference software drivers and applications, along with the associated documentation to reduce the amount of time for software development. Files and data include:

- HDL source files for the function design
- HDL source files for block level and top level testing
- Functional specification
- Timing constraints summary document
- Generic SRAM simulation models
- C Reference Driver

READY?

Trilinear Technologies offers the DSC Encoder core either directly or through a qualified distribution partner under several licensing models. Please contact Trilinear Technologies for pricing and additional information:

trilineartech.com