



PRODUCTION READY
REFERENCE DESIGN
FOR ADVANCED
VIDEO ENHANCEMENT

CONSUMER VIDEO ENHANCEMENT REFERENCE DESIGN

Challenges faced by HDTV OEMs

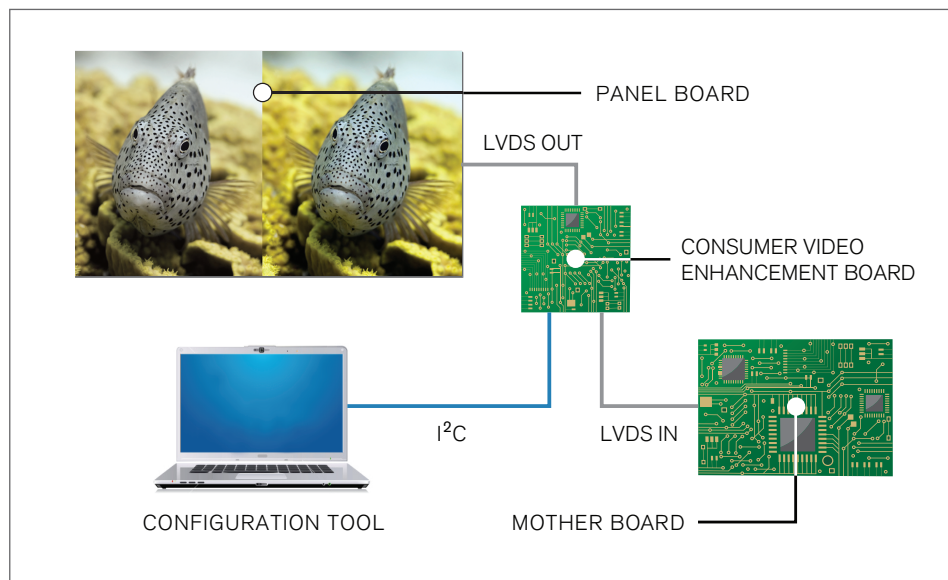
- Devote significant financial and intellectual resources to develop advanced video algorithms, or release undifferentiated products
- Compete for customers in a marketplace flooded with homogenous products built using standard ASSPs
- Compress design cycles and ship high-volume products faster, while working with fewer resources

The Xilinx Solution

- Pre-validated, high-volume production vetted reference design, with video enhancement IP developed by Vestek, a recognized provider of video IP
- Advanced video algorithms addressing the independent facets of video and picture quality
- Easy to implement LVDS in/LVDS out production ready solution

The Xilinx® Consumer Video Enhancement Reference Design is a turn key, production ready Spartan® FPGA-based suite of advanced video enhancement algorithms specifically developed to improve image and video quality in high definition televisions enabling Digital Television OEMs to meet market windows and offer enhanced picture quality products in record time without dedicating a team of video algorithm experts. The reference design includes a Spartan FPGA, digital video enhancement IP, user documentation, bill of materials, and Gerber PCB files.

IMPLEMENTATION OF THE CONSUMER VIDEO ENHANCEMENT REFERENCE DESIGN



The Consumer Video Enhancement board operates between the motherboard and the panel board through a LVDS in/LVDS out connection. Parameters are loaded and updated via an I²C interface and fine tuned for picture quality on a PC-based configuration tool.

ADVANCED VIDEO ALGORITHMS

Pre-validated and already shipping in high volume, the sophisticated algorithm suite allows OEMs to differentiate from competitors and provide superior enhancement in: color vividness, skin tone, image sharpness, and contrast. Each algorithm works to address each pixel individually instead of universally for the best picture quality and viewer experience.

ORIGINAL FRAME



ENHANCED FRAME



Color Optimization

The color enhancement algorithm produces pictures with more natural and vivid color through an adaptive application of error correction. The algorithm analyzes individual pixels in comparison to the brightness level of a scene – modifying the saturation level of red, green, and blue levels independently. The end result is richer, more vibrant colors.

ORIGINAL FRAME



ENHANCED FRAME



Skin Tone Correction

The skin tone correction algorithm automatically detects skin color areas and corrects hue errors. Brightness and color information are used to determine skin tone regions. The pixels are then corrected to match a wide range of target skin tone regions from yellow-based to red-based tones. Skin tones are able to appear more natural based on specific regional preferences.

Sharpness Enhancer

The sharpness enhancement algorithm produces natural images with much sharper transients by using a 2-D sharpening filter to enhance both vertical and horizontal details. The algorithm automatically adjusts the level of sharpness to be applied in order to avoid artifacts resulting in a noise free, sharper image with superior details and more natural appearance.

Contrast Enhancer

The contrast enhancer algorithm analyzes the visual signal and performs automatic contrast and brightness adjustment. The dark regions of the picture are stretched toward darker intensities without losing any fine detail and bright portions are stretched toward whiter levels. Regions between black and white levels are enhanced by applying an adaptive and elaborate improvement which extends the dynamic range of contrast, creating more depth and realistic perception.

Take the NEXT STEP

For more information on the reference design, or to order please contact your local sales representative.
For more information on Xilinx solutions for Consumer video, please visit www.xilinx.com/consumer

Corporate Headquarters

Xilinx, Inc.
2100 Logic Drive
San Jose, CA 95124
USA
Tel: 408-559-7778
www.xilinx.com

Europe

Xilinx Europe
One Logic Drive
Citywest Business Campus
Saggart, County Dublin
Ireland
Tel: +353-1-464-0311
www.xilinx.com

Japan

Xilinx K.K.
Art Village Osaki Central Tower 4F
1-2-2 Osaki, Shinagawa-ku
Tokyo 141-0032 Japan
Tel: +81-3-6744-7777
japan.xilinx.com

Asia Pacific Pte. Ltd.

Xilinx, Asia Pacific
5 Changi Business Park
Singapore 486040
Tel: +65-6407-3000
www.xilinx.com



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