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SmartASIC Introduces TV Video Processor With Innovative Parametric Cube-Based Scaling Engine, DSP

Proprietary engine enhances the picture viewing quality

SAN JOSE, Calif. – January 6, 2001 – SmartASIC, Inc. today introduced the STV102, an integrated TV video processor that is ideal for digital progressive scan and LCD television sets and projectors. Incorporating SmartASIC's innovative parametric cube-based scaling engine and other proprietary digital signal processing (DSP) techniques, the STV102 is a single-chip processor that improves the viewing quality of TV display. The STV102 conforms to the SDTV (Standard Definition Television) standards of the HDTV standard, also called 480p, making it ideal for lower-end, high-quality television sets.

"TV manufacturers look at two things when they look at new technology," stated C. C. Kau, President and CEO of SmartASIC. "They want the best picture quality and the lowest system cost. SmartASIC's STV102 employs several sophisticated algorithms that let digital television sets display noticeably better quality images than their analog equivalents. And we've integrated many system components in the STV102 to lower the overall system cost. We aim the STV102 squarely at the high-volume segment of the consumer TV market."

Strong Market for STV102

The STV102 is aimed at two main markets: LCD TVs and projectors; and larger screen conventional picture tube-based TVs. LCD projectors have become much more popular for business applications due to their low weight and recent drops in price. LCD TVs are expected to become more popular as their prices drop. The market for larger screen conventional TVs is

particularly strong in China, where it is expected that all large screen TVs (29" and larger) will use digital processing to enhance the images coming through the airwaves, because much of the country does not have cable TV service. But this same technology is equally applicable in the US, where SmartASIC's technology can provide a visually better image without the expense of going all the way to HDTV.

Enhancing the Input

The STV102 supports two-channel video inputs. One channel input can be programmed with 24 bits RGB or 12/16/24-bit YUV, the other channel supports 16-bit YUV input. The STV102 allows for seamless interfacing with industry standard video decoders. SmartASIC's STV102 converts analog TV video streams to digital data and performs anti-flickering, image enhancement and output control. To prevent flickering, it employs a proprietary de-interlacing engine with programmable 3D motion detection. It applies motion adaptive de-interlacing with user-programmable thresholds.

To reduce noise, the STV102 uses adaptive DSP techniques to optimize images in different regions of the display screen, effectively removing Guassian and uniform noise in the background regions while preserving the sharpness of the major images. These techniques also remove "salt and pepper" noise in all regions of the display.

The STV102 includes a built-in color space converter with programmable gamma correction for different color temperatures and contrast. The STV102 enhances image quality by providing programmable sharpness enhancement and anti-aliasing. A black-level expander enhances contrast. The STV102 incorporates three filters for luminance peaking control. Each of these filters – low pass, band pass and high pass – have independently programmable gain. Dithering is used for 16-bit RGB output.

Parametric cubic-based scaling engine

The STV102's proprietary parametric cubic-based scaling engine uses high-order interpolation to regenerate missing or needed information. For example, in the case of an image that needed to be scaled by a factor of two, from 100 to 200 pixels, the missing pixels are generated by interpolating between the two pixels that are on either side of the pixel that needs to be generated. Essentially, it looks at a block of 4 x 4 or 16 pixels to determine the value for the missing pixel. This programmable, non-linear scaling engine can be optimized for any expansion ratio and provides for independent expansion ratios in both the horizontal and vertical directions.

Internal OSD, PIP , Output DAC

To reduce overall system cost, SmartASIC incorporated an internal on screen display (OSD). The STV102 provides bit-mapped OSD support for up to 128 internal fonts for multi-language support. Blinking, inverse, transparency and highlight effects are supported. The window location is programmable.

To further reduce overall system cost, SmartASIC incorporated an internal output DAC.

The STV102 supports picture in picture (PIP) and provides for easy switching between the main and sub pictures. The size and location of the PIP window is programmable. Picture scan allows up to 16 pictures on the same screen. Both the main and sub channels can be progressive or interlaced input.

The STV102 provides programmable output resolution up to XGA (1024 x 768) or native NTSC/PAL/SECAM. It provides frame rate conversion to increase the output refresh rate up to 75 Hz de-interlaced or 120 Hz interlaced, eliminating the ability of the human eye to discern flicker. It can output 24/48 bit RGB, 24-bit 4:4:4 YUV, or 16-bit 4:2:2 YUV. It provides programmable output timing control and dual pixel (48-bit) output support for LCD TVs and a built-in output DAC for digital progressive scan TV.

Pricing and Availability

The STV102 is sampling now, with production volumes available in the first quarter of 2001. It is priced at $15.00 (thousand unit pricing) and packaged in a 160-pin PQFP. It operates at 2.5V power with 5V tolerant I/O.

SmartASIC, Inc., a fabless semiconductor company, is a major worldwide supplier of TFT LCD controller IC, and is developing video processing technology for digital display products. In the first quarter of 2000, SmartASIC was the third largest worldwide supplier of LCD monitor controller ICs, according to DisplaySearch. For more information, go to www.smartasic.com.

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