Contact:
Deborah Wei – SmartASIC
408-283-5098 x 201 dwei@smartasic.com

Paula Jones – PR Consultant
650-967-3711 paula@bizblues.com

SmartASIC's TV Video Processor Uses DSP to Improve Image Quality of Conventional TV Signals

San Jose, CALIF., June 1, 1999 – SmartASIC, Inc., a start-up company with expertise in display technology, today introduced the STV100 TV Video Processor, a single-chip solution that improves the quality of conventional television signals by employing sophisticated digital processing techniques.

"We've developed sophisticated algorithms that enhance this analog input so the digital displays provide better picture quality than their analog equivalents," said C. C. Kau, President and CEO of SmartASIC. "By integrating many functions into one chip, we're able to lower the cost of the display electronics. By providing complete system-level support, including reference board and firmware development, we're able to help our customers speed new designs to market."

SmartASIC's STV100 TV Video Processor handles various formats of traditional analog TV video input, such as NTSC and PAL, and digital computer video in RGB/YUV formats. The processor converts any analog TV video streams to digital data. Images are enhanced through color space conversion using gamma correction, adaptive 3D de-interlacing, noise reduction, and sophisticated video processing algorithms. To further improve image quality, the refresh rate is increased, which removes flicker, and the resolution is increased, with sophisticated algorithms that help interpolate the image as it scales up.

Growing Market for STV100

There are two main markets for the STV100: 1) LCD TVs and projectors, and 2) larger screen conventional picture tube-based TVs. LCD projectors are becoming more

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popular for business applications due to their low weight and recent drops in price. LCD TVs are expected to become much more popular as prices drop.

The second market is for larger screen conventional picture tube-based TVs. Here, one of the biggest opportunities is in China, where in 1998 25 million televisions were sold (source: China Business Monthly information at http://stats.surfchina.com/). Manufacturers supplying televisions for this market estimate that high-end (29" and larger screens) television sets represent 15-20 percent of the units sold and that the market for these large-screen TVs is growing at over 100 percent per year.

"While the initial market is in China, where it is expected that all large screen TVs (29" and larger) will use digital processing, the same technology can be used in the US to improve the quality of analog broadcast signals on large screen TVs," stated Kau. "Currently, we are talking to several Asian TV manufacturers who plan to employ technology like this for the US market. This will provide a visually better image without the expense of going all the way to HDTV."

Technical Specs for the STV100

The STV100 supports two-channel video inputs. Both channel inputs can be programmed with 24 bits RGB or YUV at 4:4:4, 4:2:2 or 4:1:1. The STV100 effectively reduces noise by using adaptive digital signal processing (DSP) techniques to optimize images in different regions of the display screen, effectively removing Gaussian and uniform noise in the background regions while preserving the sharpness of major images. These techniques also remove "salt and pepper" noise in all regions of the display.

The STV100 processes the video stream and provides anti-flickering, image enhancement and output control. To prevent flickering, it employs either a 2D vector-based de-interlace using the controller's built-in memory or adaptive 3D de-interlacing, which requires external frame memory.

To enhance the image quality, the STV100 provides programmable sharpness enhancement and anti-aliasing. A black-level expander is used to enhance contrast. The image is scaled using either bi-linear or Cubic B-spline interpolation. The STV100

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.

The STV100 provides programmable output resolution at SVGA (800x600) or native NTSC/PAL/SECAM. It provides frame rate conversion to increase the output refresh rate up to 60Hz or 75Hz de-interlaced or 100Hz/120Hz interlaced. It can output 24/30-bit RGB, 24/30-bit 4:4:4 YUV, 16-bit 4:2:2 YUV, or 8-bit 4:2:2 YUV (CCIR-656). The aspect ratio is programmable for either 4:3 or 16:9.

Pricing and Availability

The STV100 TV video processor, packaged in a 160-pin PQFP, will be sampling in the third quarter and will be available in production quantities in the fourth quarter of 1999. It is priced at $20 in quantities of 1,000.

SmartASIC, Inc., a fabless semiconductor company, was founded in February 1998 in San Jose, Calif. SmartASIC develops video processing controllers for the huge emerging digital display market. The company's core technology transforms and enhances traditional analog video images into images for digital TV, PC/TV systems, TFT LCD flat panel monitors and projectors. For more information, go to www.smartasic.com.

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