STMicroelectronics Announces Enhanced Analog-Input LCD Display Engine for XGA/SXGA Resolution

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'Kona' family of scaler ICs offers two-channel output, 10-bit ADC, and advanced on-screen display in a physically small 100-pin package

STMicroelectronics has confirmed availability in volume of the recently announced ADE3800 'Kona' family of LCD (Liquid Crystal Display) scaler chips. The new products build on the success of the widely-used 'Loihi' and 'Lanai' families, using an advanced 0.15-micron process technology for minimum die size and offering more output options, a new and very advanced On Screen Display (OSD) engine, and improved performance, with three of the four devices in the family available in a cost-effective 14 x 14mm 100-pin package.

ST's ADE3800 scalers provide a highly integrated solution for LCD monitor manufacturers, taking analog RGB (Red Green Blue) video input signals and generating RSDS (Reduced Swing Differential Signal) or LVDS (Low Voltage Differential Signal) outputs for LCDs up to XGA (Extended Graphics Array - 1024 x 768 pixels) or SXGA (Super-Extended Graphics Array - 1280 x 1024 pixels) resolution. As well as high-quality scaling - from 5:1 upscale to 2:1 downscale - and generating the necessary timing signals, the Kona chips also include a broad range of additional features designed to enhance the end user's experience and to minimize the load on the monitor's microcontroller, allowing a simpler and cheaper MCU to be used.

The high performance OSD engine - redesigned and enhanced from the display engine of the earlier ADE3700 'Lanai' scaler - now offers 1 to 4bpp (bits per pixel) text display with proportional fonts, a 64-color TrueColor palette with 4-bit alpha blending, and supports multi-window displays up to full screen size with the text placed anywhere on the screen. Bordering, shadowing, transparency, fade in and out, and font rotation effects are built-in, and the OSD can easily be animated and can 'fly' into position. The new features are designed to satisfy the most demanding OSD specifications.

The four products in the ADE3800 family provide embedded output interfaces for either LVDS or RSDS display signals, at either XGA or SXGA resolutions. All use the LQFP100 (low-profile quad-flat-pack) package, except for the SXGA RSDS ADE3800SXT which is supplied in a LQFP128. A programmable Timing Controller (TCON) provides versatile control of the external timing signals required by XGA/SXGA SmartPanels; its software interface has been simplified to allow easier programming, with common functions hardcoded. An advanced flicker detection and reduction scheme is included, and a pattern generator is built in for production testing.

"ST is among the world's leading suppliers of display circuits, including dedicated system-on-chip solutions, microcontrollers, memories and power products," said Gabriel Guglielmi, Business Development Manager for ST's Display ICs Division. "The Loihi and Lanai scalers are widely used in currently available monitors, and mass production deliveries of Kona to major LCD monitor manufacturers has already started."

ST's IQ Scaling™ engine uses Context-Sensitive Scaling to detect picture content and choose the optimum scaling algorithms to deliver both sharp text and smooth graphics in the final image, in up to four different windows. The appropriate levels of sharpening and gamma

correction are applied automatically, using a 30-bit programmable and non-interpolated gamma table. Picture quality is further enhanced by the PerfectColor™ engine, which provides programmable 3D color warp within the sRGB color space; enables digital brightness, contrast, hue, and saturation control; and uses the industry's most sophisticated temporal and spatial dithering technology to provide precise color representation across different LCD panels.

Video input resolution has been increased from 9 to 10 bits per color, with an advanced 3-channel, 140MHz, 10-bit ADC, with an ultra-low-jitter digital line-lock PLL. Communication with the host MCU is via an economical I2C serial interface, and the scalers require few external components. The package pin-out is designed to allow a two-layer printed circuit board, and pc-board layout is further simplified by the provision of two sets of I2C bus and Reset pins.

Kona will also be available in lead-free packages by the first quarter of 2005, using ST's ECOPACK Lead-free technology for RoHS-compliance (the EU's Restriction on Use of Hazardous Substances Directive). Additional features now under qualification include UXGA (Ultra-Extended Graphics Array) capability (1600 x 1200 pixels) with no additional memory requirement and with pixel rate up to 203M-pixels/s; a 203MHz ADC; and an optimized solution for low cost LCD-TV with spatial de-interlacing, eliminating the need for a frame rate convertor and external memory.

Available now, pricing for the ADE3800 is US$6, in quantities of 1000. The dual-input version, which is pin-to-pin compatible with the ADE3800, will be sampling by the end of the year.

About LCD Scalers

Flat-panel LCD displays are increasingly used on desktops in place of

CRT (cathode-ray tube) monitors, occupying a considerably smaller desk area and consuming less power. Although the end user may see the difference between an LCD and a CRT simply as desk space versus cost, there are important technical differences, of which the most significant is that while CRT monitors can handle many different resolutions, the resolution of a given LCD monitor is fixed; if the image output by the PC does not match the resolution of the monitor it needs to be scaled to fit, using sophisticated algorithms to preserve image quality.

In addition, different physical mechanisms are used to produce the images, requiring the color data to be transformed to match the target display. And finally, because graphics cards have typically been designed to output to CRT monitors, extensive timing conversions are necessary to synchronize their output with LCD monitors. ST's Analog LCD Display Engines - commonly simply referred to as 'scalers' - are single-chip solutions designed to perform all of these functions.