Brainstorm: Next Generation Displays

"*What technology trends do you feel will dominate the development of next-generation displays?*"

Raouf Abdullah, Pericom Semiconductor, www.pericom.com [1]

Next-Generation displays are being driven by consumer demand for higher resolutions, faster refresh rates, and deeper color depths. Consumers are also driving demands for larger panel sizes at lower costs. Finally, the environment is shaping the future plans of next generation displays.

Higher data rates beyond 10 Gbps are now required for wider screen aspect ratios (16x9 vs. 4x3), increase in color depths (24 bits to 48 bits), higher refresh rates (60 Hz to 120 Hz), and higher resolutions (1080 p and 1440 p). To achieve audio/video data rates beyond 10 Gbps, one can only choose HDMI (10.2 Gbps max) or DisplayPort (10.8 Gbps max). HDMI has become the dominant player in the consumer world due to early adoption, while DP strives for dominance in the PC world by supporting lower cost PC-based monitors.

In regards to the market drive for larger panel sizes, it's not the 108" LCD panel from Sharp that consumers are pushing for, but panels from 25"-50". According to DisplaySearch, in 2006 the number one panel size for DTV market was 20"-21", while by 2011 the number one panel size will increase to 30"-34". This is lead by reduced costs of 30"-34" panels. While 20" panel ASPs dropped 4% from '06-'07, 30"-50" panel ASPs have dropped >30% from '06-'07. The adoption of DisplayPort Panels can also lead to quicker ASP reduction of the entire system. This is because direct drive DP Monitors can eliminate costly SCALAR ICs which allow PCs to directly connect to panels.

Finally, environmental concerns are pushing panels to transition from mercury contained fluorescent-tube-based LCDs to panels with LED backlighting. These panels can increase the color gamut, reduce system power, and allow for thinner displays. An example is Apple's MacBook Air.

In conclusion, higher data-rates, higher resolutions, deeper color depths, thinner displays, and mercury free designs are gong to lead the future of next-generation displays.

Lee K. Koh, Microchip Technology, **www.microchip.com** [2]

OLED and E-paper are becoming the focus of new display technologies, and may dominate the development of next-generation displays. These technologies are designed specifically to address several key display issues, including power consumption, small size, ruggedness and better imaging. As these technologies become mainstream in the consumer markets, many embedded system designs are expected to capitalize on their dramatic reduction in pricing and technological superiority. Example embedded applications include electronic shelf labels, smart cards, test and measurement units, medical equipment, white-good appliances and industrial automation. Together with capacitive touch-sense keypads and touch-screen interfaces, these

OLED and E-paper technologies are able to significantly upgrade the user-interface experience. Additionally, while TFT LCD displays are mature in the consumer realm, they are just beginning to take hold in the embedded space.

Microchip is leading these efforts by providing a cost-effective graphics solution targeted at the embedded market. With a wide variety of 16- and 32-bit microcontrollers and a free graphics software library, Microchip enables applications in which

graphics had previously been cost prohibitive.

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Chung Hoon Lee, Seoul Semiconductor, www.seoulsemicon.com/en/ [4]

LCD TVs are driving dramatic advances in LED backlighting by demanding larger, thinner, lighter, more energy efficient and durable displays. As part of our efforts to introduce innovative backlight LED solutions for the next-generation of LCD TV displays, Seoul Semiconductor's R&D team is developing Red, Green, and Blue Acriches. Acriche is Seoul Semiconductor's AC-driven semiconductor lighting source that eliminates the need of bulky converters, drivers or ballasts. Using Acriche, designers of large LCD TV displays can reduce component count, decrease overall size and weight of the final product, while improving reliability.

In the laptop display market, LEDs are rapidly replacing CCFLs (Cold Cathode Fluorescent Lamps). Advanced LED solutions including Seoul Semiconductor's white and RGB Side View and Top View LED, offer many advantages over CCFLs. For instance, CCFLs require high voltage inverters that reduce battery life. CCFLs also produce fewer nits than LED solutions. This year, 15-20 % of laptops manufactured will have LEDs for backlighting. Next year, 40-50% will have LED backlighting. Within the next 3

years, you can expect 70-80% of laptops in the market with LED backlighting.

Seoul Semiconductor developed and patented another solution of Non-polar LED technology for TV and lap-top LCD with UCSB. This solution not only reduces 15% of cost by removal of polarizer but it also improves power efficiency by 30-40%.

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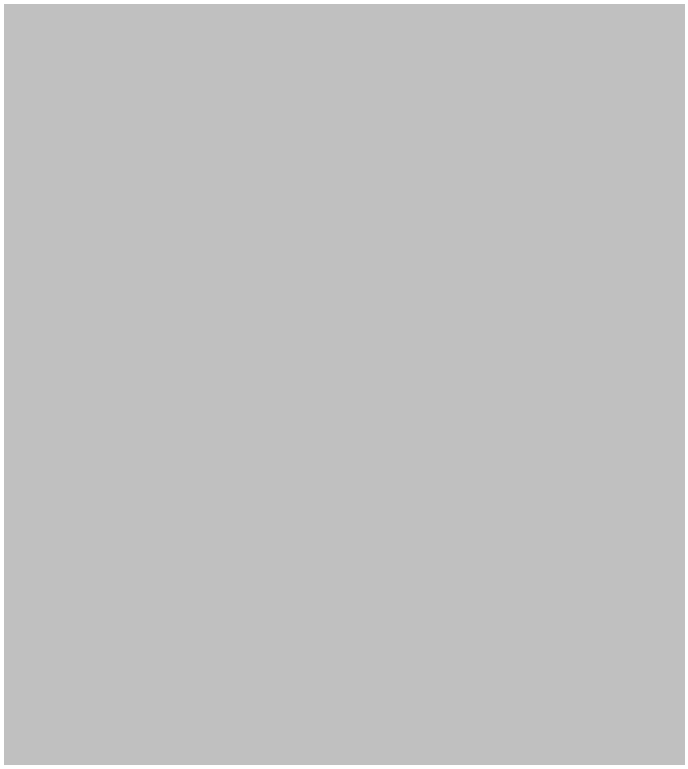

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