HIGH-DYNAMIC-RANGE DISPLAYS

Thursday, May 24 / 9:00 10:20 am / Room 104A

Chair:
Jean-Pierre Guillou, Sony Electronics, San Diego, CA, U.S.A.

Co-Chair:
Michiel A. Klompenhouwer, Philips Research Laboratories, Eindhoven, The Netherlands

39.1: Adaptive Dimming and Boosting Backlight for LCD-TV Systems (9:00)

P. De Greef, H. Groot Hulze
NXP Semiconductors, Eindhoven, The Netherlands

H. Groot Hulze
Phillips Electronics, Eindhoven, The Netherlands

Light leaking through LCD panels driven to black can be observed as a poor black-level which limits the contrast ratio. Adaptive dimming technology can be applied to attenuate the backlight, improving image quality and saving power. The contrast may increase up to 5 times (CCFL/EEFL), the local brightness may double, and contrast may increase up to 20 times (HCFL). Alternatively, for 2-D dimming, the spatial contrast may increase up to a factor of 100 and the temporal contrast may theoretically be increased to infinity (LED). At the same time, up to 50% average power may be saved.

39.2: High-Contrast LCD TV Using Active Dynamic LED Backlight (9:20)

H. J. Peng, W. Zhang, C. K. Hung, C. J. Tsai, K. W. Ng, S. L. Chen
Hong Kong Applied Science and Technology Research Institute, Shatin, Hong Kong

A 32-in. LCD TV using active dynamic LED backlights to significantly enhance the display contrast and lower power consumption will be demonstrated. A high contrast of 120,000:1, with a maximum luminance of 500 cd/m^2, was achieved. Compared with a static LED backlight, up to 70% of the power can be saved depending on the average picture level (APL) of the image.

39.3: Locally Pixel-Compensated Backlight Dimming for Improving Static Contrast on LED Backlit LCDs (9:40)

H-F. Chen, J-H. Sung, T-Y. Ha, Y-J. Park
Samsung Electronics Co., Ltd., Kyunggi-do, Korea

Static contrast above 20,000:1 has been achieved on a large-sized LCD using a new driving method, and no obvious artifacts were observed. The backlight luminance is dimmed locally along with the image, and pixel values are compensated synchronously according to the luminance profile of the dimmed backlight.

39.4: Inverse of Mapping Function (IMF) Method for Image-Quality Enhancement of High-Dynamic-Range LCD TVs (10:00)

F-C. Lin, C-Y. Liao, L-Y. Liao, Y-P. Huang, H-P. Shieh
National Chiao Tung University, Hsinchu, Taiwan, ROC

P-J. Tsai, T-M. Wang, Y-J. Hsieh
AU Optronics Corporation, Hsinchu, Taiwan, ROC

A high-dynamic-range liquid-crystal display (HDR-LCD) can greatly enhance the contrast ratio of an image by using a locally controlled dynamic backlight. A novel method, the inverse of a mapping function (IMF), was demonstrated to further improve the HDR image quality from the information of each frame. By using IMF, the image contrast ratio for a 37-in. HDR LCD TV was successfully improved to ~20,000:1 while maintaining high brightness and clear image details. For mass-production consideration, the backlight of the 37-in. HDR LCD TV was divided into 8 × 8 zones to reduce the hardware computation complexity.

BREAK (10:20–10:40)

AUTHOR INTERVIEWS (5:00–6:00)