

本期目录 | 下期目录 | 过刊浏览 | 高级检索

[打印本页] [关闭]

器件物理及器件制备技术

临界背光亮度法改善LCD动态调光中的灰度截断

屠震涛, 郑仁涛, 张小宁

西安交通大学 电子物理与器件教育部重点实验室, 陕西 西安 710049

摘要: LED背光源LCD采用动态调光后,为了在灰度截断和功耗之间取得平衡,文章提出了基于临界背光亮度的灰度截断改善方法。该方法首先根据不同的算法分别计算出背光中间模块和边缘模块不产生灰度截断的临界背光亮度,然后将所得到的临界背光亮度与用传统方法得到的对应背光亮度做比较,选择较大值作为最终该模块的理想背光亮度并进行亮度的叠加。液晶补偿的灰度级由叠加后背光亮度得到。81 cm(32 in)LED背光源实验结果表明,该方法能够有效地改善灰度截断,同时功耗没有显著增加。

关键词: 临界背光亮度 灰度截断 动态调光 LCD

Critical Backlight Luminance for Reducing Clipping Artifacts in Local Dimming LCDs

TU Zhen-tao, ZHENG Ren-tao, ZHANG Xiao-ning

Key Laboratory of Physical Electronics and Devices of the Ministry of Education, Xi'an Jiaotong University, Xi'an 710049, China

Abstract: A critical backlight luminance method to get balance between clipping artifacts and power consumption in local dimming LCDs is proposed. Firstly, the critical backlight luminance of middle backlight blocks and edge backlight blocks are computed with different process. Then the critical luminance is compared with the backlight luminance computed by conventional method, and the larger one is selected as the ideal backlight luminance for superimposing luminance. Finally, the gray-scales after liquid crystal compensation can be obtained according to the superimposed backlight luminance. The experiment results with 81 cm(32 in) LED backlight show that clipping artifacts ratio is reduced effectively and power consumption is not increased obviously.

Keywords: critical backlight clipping artifact backlight dimming LCD

收稿日期 2012-02-10 修回日期 2012-03-20 网络版发布日期

基金项目:

国家核高基重大专项基金(No.2009ZX01033-001-003-5)

通讯作者: 张小宁, E-mail: znn@mail.xjtu.edu.cn

作者简介:

作者Email: znn@mail.xjtu.edu.cn

参考文献:

- [1] 张普雷, 史永胜, 史耀华, 等. 大功率背光源用LED驱动电路的研究现状与进展[J]. 液晶与显示, 2010, 25(1): 68-74.
- [2] Shirai T, Shimizukawa S, Shiga T, et al. RGB-LED backlights for LCD-TVs with OD, 1D, and 2D adaptive dimming // *SID 2006 Digest*, San Francisco: SID, 2006: 1520-1523.
- [3] Chen H F, Sung J, Ha T, et al. Locally pixel-compensated backlight dimming on LED-backlit LCD TV [J]. *J. SID*, 2007, 15(12): 981-988.
- [4] Shiga T, Shimizukawa S, Mikoshiba S. Power savings and enhancement of gray-scale capability of LCD TVs with an adaptive dimming technique [J]. *J. SID*, 2008, 16(2): 311-316.
- [5] Hulze H G, Greef P. Driving an adaptive local dimming backlight for LCD-TV systems // *SID 2008 Digest*, Los Angeles: SID, 2008: 772-775.
- [6] Cho H S, Kim H, Kwon O K. Adaptive selection algorithm for LED backlight of LCD-TVs // *IDW 2008 Digest*, Niiyata, Japan: International Display Workshop, 2008: 285-288.
- [7] Lin F C, Huang Y P, Liao L Y, et al. Dynamic backlight gamma on high dynamic range LCD TVs [J]. *J. Display Technology*, 2008, 4(2): 139-146.
- [8] Cho H, Kwon O K. A backlight dimming algorithm for low power and high image quality LCD application [J]. *IEEE Trans. Consumer Electron.*, 2009, 55(2): 839-844.
- [9] Nam H. A color compensation algorithm to avoid color distortion in active dimming liquid crystal displays [J]. *IEEE Trans. Consumer Electron.*, 2010, 56(4): 2569-2576.
- [10] Cho H, Kwon O K. A local dimming algorithm for low power LCD TVs using edge-type LED backlight [J]. *IEEE Trans. Consumer Electron.*, 2010, 56(4): 2054-2060.
- [11] Lai C C, Tsai C C. Backlight power reduction and image contrast enhancement using adaptive dimming for global backlight applications [J]. *IEEE Trans. Consumer Electron.*, 2008, 54(2): 669-674.
- [12] Kerofsky L, Daly S. Brightness preservation for LCD backlight dimming [J]. *J. Soc. Inf. Display*, 2006, 14(12): 1111-1118.
- [13] Hong J J, Kim S E, Song W J. A clipping reduction algorithm using backlight luminance compensation for local dimming liquid crystal displays [J]. *IEEE Trans. Consumer Electron.*, 2010, 54(1): 240-246.
- [14] Chen H F, Ha T H, Sung J H, et al. Quantified evaluation for clipping artifact of local dimming in LCDs // *SID 2010 Digest*, Seattle, USA: SID, 2010: 315-318.

本刊中的类似文章

1. 邓永停, 李洪文. 伺服控制系统中液晶显示设计[J]. 液晶与显示, 2012,(3): 342-346
2. 林鸿涛, 邵玉生, 胡海琛, 胡巍浩, 张亮, 邵喜斌. TFT-LCD中驱动信号对线残像的改善研究[J]. 液晶与显示, 2012,(3): 359-363
3. 赵海丽, 姜会林, 王晓曼, 刘智. 空间光通信中高帧频相机动态调光技术研究[J]. 液晶与显示, 2012,(2): 267-270
4. 石天雷, 杨国波, 程石, 杭苗. Zara漏光和Rubbing Mura改善研究[J]. 液晶与显示, 2012,(2): 208-211
5. 王鸣浩, 吴小霞. 基于FPGA的通用液晶显示控制器的设计和实现[J]. 液晶与显示, 2012,27(1): 87-92
6. 高原, 魏廷存, 李博. 10-bit TFT-LCD源驱动电路的设计[J]. 液晶与显示, 2011,26(6): 808-812
7. 程石, 王涛, 张敏, 张铁军, 史华威, 杨国波. TFT-LCD中隔垫物密度与Push Mura和低温气泡的关系[J]. 液晶与显示, 2011,26(5): 604-607
8. 张伽伟, 周安栋, 罗勇. ARM11嵌入式系统Linux下LCD的驱动设计[J]. 液晶与显示, 2011,26(5): 660-664
9. 李妥, 李奇奋, 李福乐, 陈志良. 大电容负载LCD驱动芯片的测试及性能改进[J]. 液晶与显示, 2011,26(5): 620-625
10. 张永斌, 胡金高. 基于DSP的LCD显示控制与设计[J]. 液晶与显示, 2011,26(5): 626-630
11. 刘敏, 戴曙光, 穆平安. 采用SOPC IP核技术实现液晶屏显示[J]. 液晶与显示, 2011,26(5): 665-672
12. 丁昊, 宋杰, 关键. 以嵌入式8051 IP核为时序控制核心的 TFT-LCD实时显示控制器[J]. 液晶与显示, 2011,26(3): 339-343
13. 杨国波, 王永茂, 王向楠, 程石, 石天雷. ODF工艺中液晶滴下量的优化[J]. 液晶与显示, 2011,26(3): 324-328
14. 石天雷 杨国波 程石 杭苗. Zara漏光和Rubbing Mura改善研究[J]. 液晶与显示, 2011,26(2): 0-0
15. 石建国, 邓春健. 二级驱动的串行TFT-LCD显示终端设计[J]. 液晶与显示, 2011,26(1): 73-77