

Optical Design of Direct Backlight Modules with White LEDs

Chen, Jin-Jia; Deng, S. W. ; Huang, K. L. ; Liu, C. X.

Abstract

This paper present an upside-down cone-shaped structure placed above the LEDs in 17-inch LCD direct backlight module, apply theory in ray-tracing optical, and use the LightTools software. Thus the light rays emitted from the LEDs can alter properating directions, and the directly upward light intensity can be reduced. Using this structure to construct the backlight module, the light intensity of LED light sources can be redistributed, and the LCD panel can be illuminated more uniformity. The backlight module with LED light sources (LXHL-PW01) produced by the Lumileds. When the 9-point measurement technology is applied, the average luminatnce of uniformity can be improved from 70% to 80%.

Key words : Backlight module;Light guide plat;White LED;

Optical design;Uniformity

摘要

本文主要應用光線追跡理論搭配 LightTools 光學軟體，進行 17 吋液晶顯示器直下式背光模組設計。所設計之背光模組採用 Lumileds 生產的 LXHL-PW01 白光 LED 為光源，並設計出一倒立的錐形圓柱體結構，使光線能夠均勻分佈在背光模組中。經由 9 點量測結果顯示，背光板之均勻度可由 70% 提升至 80%。