

HDTV용 CRT 프로젝션 광학엔진의 MTF 측정 연구

MTF measurement for optical engine of CRT rear projection HDTV

Jong Sup Song, Ji Young Lee, Yun Woo Lee*, Hoi Youn Lee*, In Won Lee*, Jae Heung Jo, Jin Ho Kim**, Sang Kyung Choi**

Dept. of Physics, Hannam University,

*Photometry & Imaging Optics Group, Korea Research Institute of Standards and Science,

**SEKONIX CO.,LTD.

jssong@kriss.re.kr

Large-screen projectors for video applications and computer monitors are convenient instruments for conference presentations as well as for TV use at home. Recently, CRT and LCD projectors have achieved higher resolutions and luminance in the projection TV. The large surface of the CRT compared to the LCD allows a great number of pixels to be displayed, while simultaneously providing maximum brightness of the final picture. In this paper, two methods for measuring the MTF of an optical engine of CRT rear projection HDTV are presented. One is a forward method that object patterns are generated on the first surface of the optical engine such as the fluorescence surface and the image analyzer to measure the MTF is located on the screen surface. It is very difficult to set up the object patterns on the surface. So we introduce a new method to test backward using a rotating image analyzer on the fluorescence surface with a 2D CCD and a relay lens. The MTF measurement system for the optical engine is shown as Fig. 1. The MTF measurement system is able to test in the full-field angle. Fig. 2 is the optical layout of the projection lens module in the backward. A software program to automatically locate and measure the position of the maximum value of the MTF at any spatial frequency is presented. Fig. 3 is the MTF results of the projection lens module for the full-field angle.

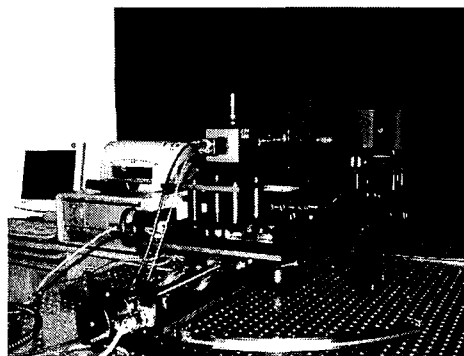


Fig. 1. MTF measurement system for an optical engine of CRT rear projection HDTV

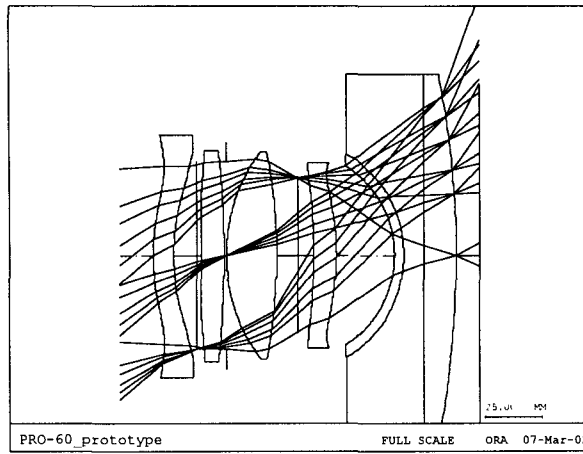


Fig. 2. Optical layout of the projection lens module in the backward.

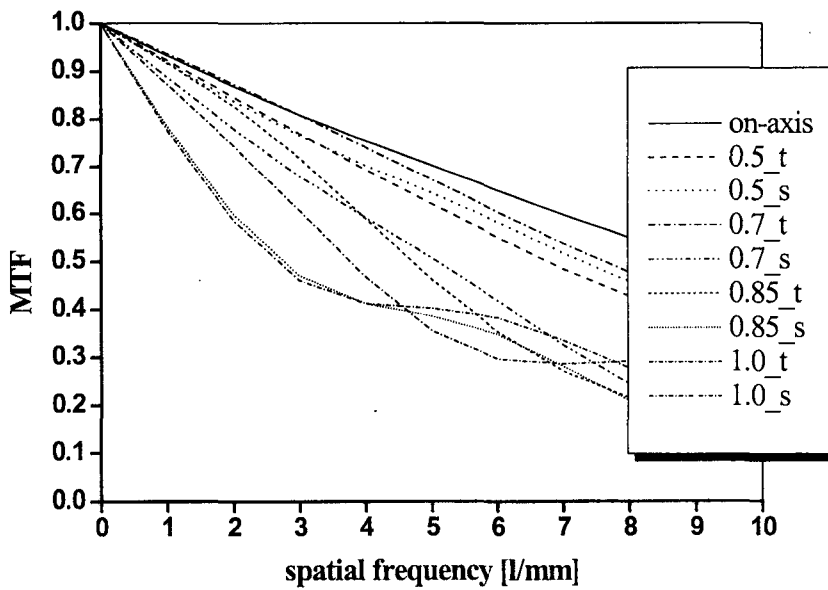


Fig. 3. MTF results of the projection lens module for the full-field angle.

Reference

- [1] ANSI/PIMA IT7.227-1998, "Electronic projection - variable resolution projectors".
- [2] ANSI/NAPM IT7.228-1997, "Electronic projection - fixed resolution projectors".
- [3] Brian T. Teipen, Duncan L. MacFarlane, "Liquid-cristal-display projector-based modulation transfer function measurements of charge-coupled-device video camera systems", Applied Optics, Vol. 39, No. 4, pp. 515-525, (2000)