Overview

In the old days, although bistable display can give high contrast, good viewing angle and low power consumption, it can just show the black and white colors that is not very attractive to most of us. By introducing color in the on-state, bistable display will become more useful in market such as advertisement display outside the shop. This year various bistable LCD technologies were investigated. Almost all optimization approaches were analyzed and derived and sets of optimized parameters and configurations for bistable LCDs were produced.

Aims and Objectives

Our aim is to investigate two issues. The first one is to discover the factors and conditions which affect the performance of three types of bistable LCDs, Bistable Twisted Nematic, Bistable Bend Switch and Ferroelectric Liquid Crystal, then compare the display performance among three technologies. The second one is to determine factors and conditions of the layers which make color switching become more flexible. Our objective is according to the results, their performance will be optimized and perform the better bistable color LCD configuration.

Color Psychology

We can use color as a powerful psychological tool to affect viewer’s feelings and behaviors. By changing to color of the product or color background of the advertisement, we can send a positive message and attract them to buy the product. It shows that color psychology is useful in the market and becomes very important.

Color can be studied as two different groups. The colors in the red area of the color spectrum are called warm colors and for though colors on the blue side of the spectrum are called cool colors.

Methodology

The first step is to study and look into the factors and configurations that affect the performance of the bistable LCDs. After getting familiar with the operating principles of each type of bistable LCD, we were able to obtain a set of equations relating the important parameters that affect the display performance of each type of bistable LCD.

Results

Two types of color coordinates would be chosen. Type one is that color coordinate is far and transmittance is high in one state while transmittance is low in another state. Type two is that color coordinate is far and transmittance is high in both states. When transmittance is greater than 0.3, the color is chosen. Increasing the thickness of phase retarder, different colors can be generated. The background represents the color in State1. The letter represents the color in State2.

Last Year:

HKUST HKUST

This Year:

HKUST HKUST

Results of a Bistable LCD using MLC-S295

Contrast Ratio = 9.38

Transmittance Curve

Contrast Ratio = 3.34

Results of BBS using QL-500-00

Contrast Ratio = 2.77

Transmittance Curve

Contrast Ratio = 2.77

Results of BBS using MLC-2008

Contrast Ratio = 9.08

Transmittance Curve

Contrast Ratio = 1.72

Results of FLC10 Single Cell

Contrast Ratio = 9.08

Transmittance Curve

Contrast Ratio = 1.72

Results of FLC10 Double Cell

Contrast Ratio = 9.08

Transmittance Curve