Field Sequential Color LCD (HK4-12)

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Introduction
Normal liquid crystal display (LCD) requires color filters to display full colors. Color filter is expensive and energy wasting as it absorbs energy. Using red-green-blue light emitting diode (RGB LED), it is possible to generate full color without color filters by color addition. Such field sequential color LCD is energy saving.

Aim
Make an LCD without using color filters for a full color display by implementing an RGB backlight.

In this project, the tasks are:
- Construction of the LED light source.
- Fabrication of the fast LCD needed for making the display.
- Driving the system.

Methodology

Software
- Arduino MEGA 2560 R3 Programming

Hardware
- Backlight driver
  - 5050 surface mount device strip light
  - KFP50N06 MOSFET
- LCD cell driver
  - ZXMN6A25DN8 MOSFET

LCD Cell
- 270°-stress splay twist mode (270°-SST)
- Cell thickness: 3.5μm
- Pretilt angle: 5°
- Twisted angle: 270°
- Alignment: Orthogonal JALS-9203
- Liquid crystal: MLC-6080 with 4.3 dopant
- Birefringence: 0.2024

Results

Whole working model:
The fourteen-segments are able to display digits (0-9) and English capital letters (A-Z) in full colors.