Custom Segment LCD Display Transflective RGB Color Backlight

Our Product Introduction

Basic Information

- Place of Origin: China
- Brand Name: BBI
- Certification: ISO90001 RoHS
- Minimum Order Quantity: 1000
- Price: 0.7-7USD
- Packaging Details: CARTON
- Delivery Time: 3-47WEEKS
- Payment Terms: T/T
- Supply Ability: 100000/MONTH

Product Specification

- Storage Temperature: -10°C To 60°C
- Display Mode: Custom
- Viewing Angle: Customizable
- Number Of Segments: CUSTOM
- Operate Temperature: 0~+50
- Voltage: 3V
- Drive Method: 1/4 Duty, 1/3 Bias
- Connector: Zebra
- Highlight: **custom segment LCD display RGB backlight**, **transflective LCD display color screen**, **custom LCD display with backlight**

Product Description

Custom Segment LCD Display Transflective RGB Color Backlight

Detail Information

LCD Type:	TN, Positive
Viewing Angle:	6 O'clock
Operating Temperature:	0~+50
Connector:	Zebra
Voltage:	3.0V

Detailed Parameters:

NO.	ITEM	SPECIFICATIONS
1	LCD Type	TN positive, transflective
2	Viewing Angle	6 O'clock
3	Drive Method	1/4 Duty, 1/3 Bias, 3.0V
4	Operating Temperature	0~+50
5	Storage Temperature	-10~+60
6	Connector	Zebra
7	LED Backlight	RGB colors
8	Outline Dimension	25.1(W)* 25.1(H)* 2.8(T) mm
9	LCD View Area	21.91(W)* 19.91(H) mm

The custom segmented LCD (segmented liquid crystal display) combined with transparent RGB color backlight is a display solution that integrates the low power consumption and high contrast characteristics of segmented LCD with the adjustable color advantage of RGB backlight. It is suitable for scenarios that require flexible color expression and have fixed display content (such as numbers, icons, simple characters), such as instrument panels, smart home control panels, and in-vehicle small screens.

Here are the relevant technical points and implementation ideas:

I. Core Components

Customized Segmented LCD Panel

Design the display segments (number fields, symbol segments, icon segments, etc.) according to requirements, customize the electrode layout through lithography or etching processes, use TN, STN or VA mode liquid crystal, ensuring clear segment display with high contrast, and supporting backlight transmission (requiring high-

transmittance liquid crystal materials and polarizing films).

RGB Backlight Module

Light Source Type: Commonly RGB LED (combination of multiple single-color LEDs or integrated RGB LED), or use RGB OLED (self-luminous, thinner but more expensive).

Drive Method: Control the brightness of the red, green, and blue channels through PWM (pulse width modulation) to achieve 1670 million color mixtures (24-bit color depth), and need to be paired with RGB backlight driver chips (such as TI's LP5523, NXP's PCA9635, etc.).
Transparency Design: The backlight module needs to be aligned with the LCD segments (to avoid light leakage), adopt a light guide plate + diffusion film structure to ensure uniform light transmission through the LCD segments, and the non-display area can be blocked by a shading layer to enhance contrast.

Driver Circuit

LCD Driver: Use segmented LCD driver chips (such as Holtek's HT1621, TI's CD4056, etc.), control each segment's on/off (on / off) through COM (common terminal) and SEG (segment terminal).

RGB Backlight Control: Output PWM signals from the MCU (such as STM32, Arduino) to the backlight driver chip to achieve color switching, brightness adjustment or dynamic effects (such as breathing, gradient).

II. Key Technical Points

Transparency Optimization

Select high-transmittance polarizing films (such as semi-transmissive or fully transmissive type) for LCD panels, and do shading treatment for non-display segment areas (such as black ink printing), reducing environmental light interference while ensuring that the backlight only transmits through the display segments.

The design of the light guide plate of the backlight module needs to match the distribution of LCD segments to avoid light leakage in non-display areas and affect the display effect.

Color Consistency and Calibration

Due to the individual differences of RGB LEDs (wavelength, brightness), software calibration (such as white balance adjustment) is required to ensure consistent color display across different devices.

Adding current feedback to the driver circuit stabilizes the LED working current, avoiding color deviation caused by voltage fluctuations.
Low Power Consumption Design

The segmented LCD itself has extremely low power consumption (microampere level), with the backlight being the main power consumption source. Dynamic control of backlight brightness (such as dimming when ambient light is strong, turning off during sleep) or the use of low-power RGB LEDs (such as below 0.1W) can be adopted.

Dynamic Effect Realization

Through MCU programming, control the PWM duty cycle of the RGB channels to achieve color switching (such as red alarm, green normal), gradient transition, flashing prompts, etc., enhancing the human-computer interaction experience. III. Application Scenarios
Instrumentation: Such as multimeters and thermometers, use different colors to distinguish measurement ranges (e.g., red for upper limit, green for normal).

Smart home: Status indicators on the control panel (such as different colors for air conditioning operation modes).
Vehicle-mounted equipment: Small screens on the dashboard display fuel level, water temperature, etc., and indicate abnormalities through color changes.

Consumer electronics: Battery power display, work status indication of small appliances, etc.

V. Development Process

Determine display requirements (segment layout, size, resolution), customize segmented LCD panels.

Design RGB backlight modules (number of light sources, layout, driving method), match LCD size and segment distribution.
Build driving circuits (LCD driver chip + RGB backlight driver + MCU), write control programs (segment display logic + color control algorithm).

Debug light transmission and color effects, optimize backlight uniformity and power consumption.

By this solution, both the simplicity and stability of segmented LCD can be retained, and the color flexibility of RGB backlight can be utilized to achieve the combination of functionality and visual experience.

Dongguan Bibuke Electronic Technology Co., Ltd.

+8613711912723 Jack@smartwinlcd.cn lcdtftscreen.com

Shangyu Commercial Centre Chang'an, Dongguan, Guangdong, China 523881