



[12] Utility Model Patent Specification

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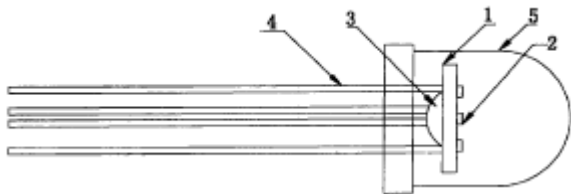
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[22] Application Date 01/08/2007 [21] Application Number 200720117937.2 [73] Patentee Lai Jinhong Address: H402, Peony Garden, Four Seasons Flower City, Bantian, Longgang District, Shenzhen City, Guangdong Province, 518000 [72] Inventor Lai Jinhong	[74] Patent Agency Shenzhen Chuangyou Patent and Trademark Agency Co., Ltd. Agent Chen Junbin Claims 1 Page Specification 3 Pages Drawings 2 Pages
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[54] Name of Utility Model
Programmable Full-Color LED Light

[57] Abstract

The present utility model discloses a programmable LED light, which consists of LED chips and a control IC board encapsulated within a housing, and pins comprising a power supply pin, a ground pin, a data input pin, and a data output pin extending out of the housing. It has a compact structure and is capable of independently achieving display control, including automatic control of display colors and display timing. It may also be controlled through an external control device or by loading and updating control programs into its built-in control IC. By integrating red, blue, and green LED chips into a single unit and employing a built-in control circuit to implement control, the LED light is capable of achieving full-color display. Due to its inherent full-color display capability and programmability, the application scope of the LED light disclosed in the present utility model is significantly expanded, and its application performance is enhanced.



1. A programmable full-color LED light, characterized by: comprises LED chips (2), a control IC board (3), pins (4), and a housing (5); of which the control IC board (3) is provided with a control IC for driving light emission of the LED chips (2); the LED chips (2) are fixedly connected to the control IC board (3) and electrically connected to the control IC; both the LED chips (2) and the control IC board (3) are encapsulated within the housing (5); and the pins (4) are extended directly or indirectly from the control IC board (3) to the exterior of the housing (5).
2. The programmable full-color LED light according to Claim 1, characterized by: the pins (4) comprise a power supply pin (41), a ground pin (42), a data input pin (43), and a data output pin (44).
3. The programmable full-color LED light according to Claim 2, characterized by: it further comprises a substrate (1), where the LED chips (2) are positioned on the upper surface of the substrate (1), and the control IC board (3) is positioned on the lower surface of the substrate (1); the substrate (1), along with the LED chips (2) and control IC board (3) on the substrate, is encapsulated within the housing (5); and the pins (4) are extended from the substrate (1) and/or the control IC board (3) to the exterior of the housing (5).
4. The programmable full-color LED light according to Claim 2 or 3, characterized by: the housing (5) comprises a housing base (51), wherein the areas between the housing base (51) and the control IC board (3) with the substrate (1) are filled with insulating thermally conductive gel.
5. The programmable full-color LED light according to any of Claims 1-3, characterized by: the LED chips (2) comprise a red LED chip (21), a green LED chip (22), and a blue LED chip (23).
6. The programmable full-color LED light according to Claim 4, characterized by: the LED chips (2) comprise a red LED chip (21), a green LED chip (22), and a blue LED chip (23).
7. The programmable full-color LED light according to Claim 5, characterized by: the red LED chip (21), green LED chip (22), and blue LED chip (23) are evenly distributed on the upper surface of the substrate (1).
8. The programmable full-color LED light according to Claim 6, characterized by: the red LED chip (21), green LED chip (22), and blue LED chip (23) are evenly distributed on the upper surface of the substrate (1).

Programmable Full-Color LED Light

[Technical Field]

The present utility model relates to an encapsulated structure of an LED light.

[Prior Art]

LEDs have numerous advantages due to their inherent optical characteristics. They have an exceptionally long service life and consume minimal power. Being a cold light source, they are safe, fire-resistant, noiseless, and do not emit ultraviolet radiation. As a result, they are increasingly used in a wide range of applications. At the present stage, LEDs are widely used for signal display, dynamic text and image playback, information display, advertising and publicity, etc. In such applications, varying numbers of LED components are assembled into arrays and controlled by a controller in a matrix fashion. Each LED component serves as a pixel, and each pixel employs a single fixed-color LED light source. Consequently, for each individual pixel, only the on-off state of the pixel can be controlled but not color changes. As a result, the overall graphic and textual information displayed on the LED screen tends to be monochromatic, leading to a less appealing visual experience.

[Invention Content]

The primary object of the present utility model is to: provide a programmable full-color LED light that offers a wide range of colors, versatile applications, and improved performance.

In order to achieve the above object, the present utility model proposes a programmable full-color LED light, comprising LED chips, a control IC board, pins, and a housing; the control IC board is provided with a control IC for driving light emission of the LED chips; the LED chips are fixedly connected to the control IC board and electrically connected to the control IC; both the LED chips and the control IC board are encapsulated within the housing; and the pins are extended directly or indirectly from the control IC board to the exterior of the housing.

The pins comprise a power supply pin, a grounding pin, a data input pin, and a data output pin.

The aforementioned programmable full-color LED light further comprises a substrate, where the LED chips are positioned on the upper surface of the substrate, and the control IC board is positioned on the lower surface of the substrate; the substrate, along with the LED chips and control IC board on the substrate, is encapsulated within the housing; and the pins are extended from the substrate and/or the control IC board to the exterior of the housing.

In the aforementioned programmable full-color LED light, the housing comprises a housing base, wherein the areas between the housing base and the control IC board with the substrate are filled with insulating thermally conductive gel.

In the aforementioned programmable full-color LED light, the LED chips comprise a red LED chip, a green LED chip, and a blue LED chip. The red LED chip, green LED chip, and blue LED chip are evenly distributed on the upper surface of the substrate.

Due to the adoption of the aforementioned solution, the present utility model brings about the following beneficial effects:

The LED light with an encapsulated control IC, as disclosed in the present utility model, has a compact structure and is capable of independently achieving display control, including automatic control of display colors and display timing. Moreover, it may also be controlled through an external control device or by loading and updating control programs into its built-in control IC. By integrating red, blue, and green LED chips into a single unit and employing a built-in control circuit to implement control, the present utility model is capable of achieving full-color display. When the LED components of the present utility model are employed to form a display matrix, each component serves as a pixel, allowing for full-color display. Consequently, compared to existing LED displays and screens, the present utility model is capable of achieving complete full-color display of graphic and textual information, resulting in a significant improvement in display quality. Due to its inherent full-color display capability and programmability, the application scope of the LED light disclosed in the present utility model is significantly expanded, and its application performance is enhanced.

[Description of Drawings]

Figure 1 is a first perspective drawing illustrating the structure of Example I.

Figure 2 is a second perspective drawing illustrating the cross-sectional structure of Example I.

Figure 3 is a schematic drawing illustrating the circuit of Example I.

[Specific Embodiments]

The present utility model is described in further detail below through specific examples and in combination with the accompanying drawings.

Example I:

In conjunction with Figures 1 and 2, this embodiment of an LED light comprises a substrate (1), LED chips (2), a control IC board (3), pins (4), and an encapsulating housing (5); the control IC board (3) is provided with a control IC for driving light emission of the LED chips (2); the LED chips (2) comprise a red LED chip (21), a green LED chip (22), and a blue LED chip (23), which are evenly distributed on the upper surface of the substrate (1) and are individually connected to the control IC; the control IC board (3) is positioned on the lower surface of the substrate (1); the substrate (1), along with the LED chips (2) and control IC board (3) on the substrate, is encapsulated within the housing (5); and the pins (4) are extended from the substrate (1) and/or the control IC board (3) to the exterior of the housing (5). These pins (4) comprise a power supply pin (41), a ground pin (42), a data input pin (43), and a data output pin (44), each of which is electrically connected to the corresponding terminals of the control IC, namely VCC terminal, GND terminal, data input pin, and data output pin.

Within the entire structure, the areas between the substrate 1 and the housing base 51 may be filled with insulating thermally conductive gel, thereby providing a large-area heat dissipation channel to reduce thermal resistance and facilitate the rapid absorption and conduction of heat generated by the LED chips; the heat produced by the LED chips may be quickly conducted through the substrate 1, pins 4, and the insulating thermally conductive gel to the housing base 51 and is then dissipated through thermal radiation and air convection, resulting in excellent heat dissipation performance and high heat dissipation efficiency, which helps ensure a longer lifespan

for the LED light.

With reference to the schematic circuit drawing shown in Figure 3, when using the LED light disclosed in the present utility model, the emission timing of the red, green, and blue LED chips may be controlled through the built-in driver program in the control IC to achieve full-color display; by utilizing the data input pin (43) and data output pin (44), the LED light may be controlled by an external driver program or a new driver program may be written to the control IC (3) by external means, to realize programmable updates.

Example II:

Different from Example 1, the structure of this embodiment comprises LED chips, a control IC board, pins, and an encapsulating housing; the structure of the control IC board has been slightly modified to meet the heat dissipation requirements of the LED chips, and the LED chips are directly mounted on this control IC board.

The scope of the present utility model is not limited to the above examples. Those skilled in the art may derive various embodiments based on the present utility model. For example, variations in size, external shape/structure, arrangement of LED chips, material substitutions, etc., are all within the scope of protection of the present utility model.

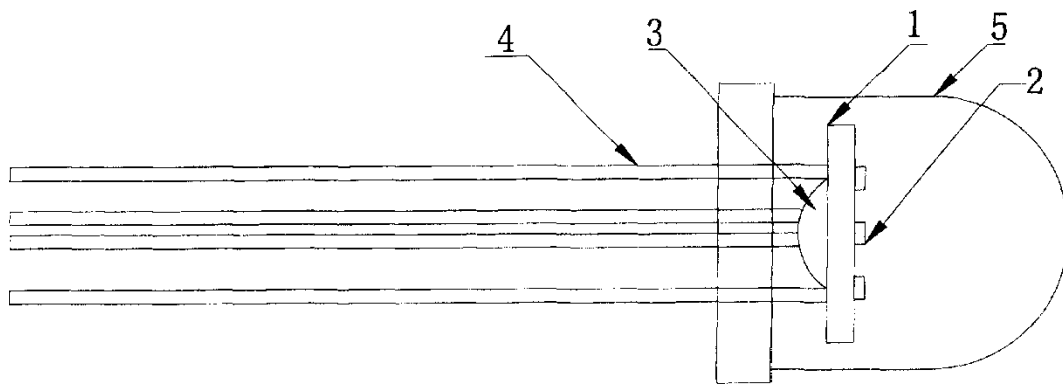


Figure 1

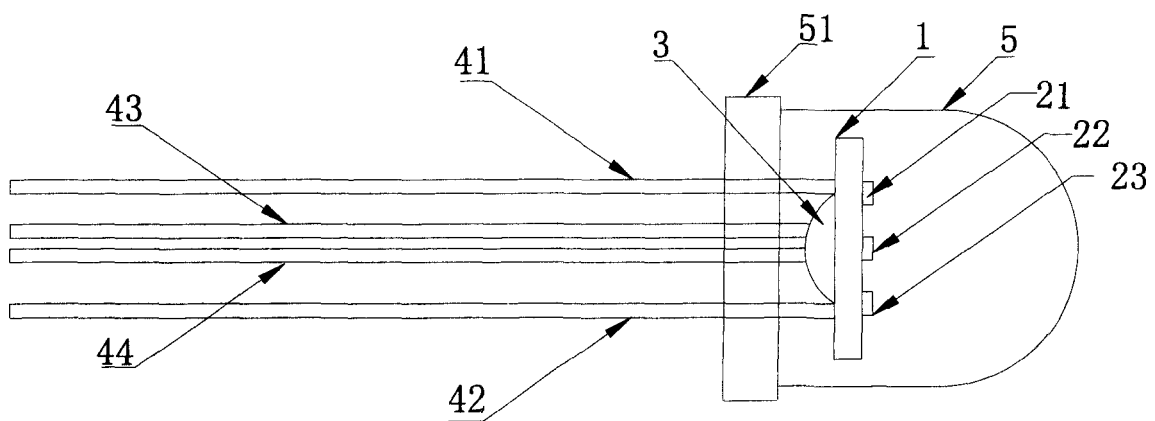


Figure 2

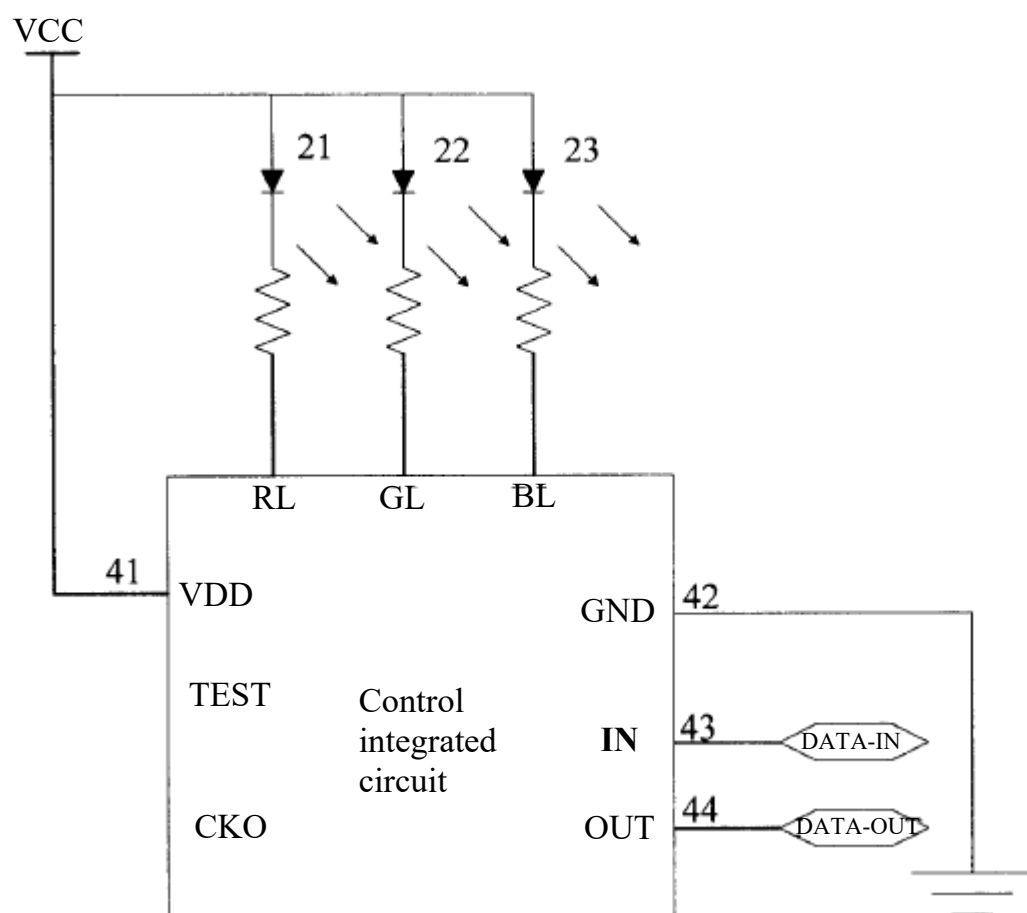


Figure 3

DECLARATION OF TAN JIA YUN

I, TAN JIA YUN, pursuant to 28 U.S.C. § 1746, hereby declare as follows:

1. I am a Translator at TransPerfect, Inc.
2. I submit this declaration to certify the accuracy of the English translation of CN201017882Y to Lai.
3. My statements are based on personal knowledge and my review of CN201017882Y to Lai and its Chinese to English translation. If called as a witness about the facts contained in these statements, I could testify competently based on such personal knowledge and the investigation I have conducted.
4. Attached as Exhibit A is a true and accurate copy of CN201017882Y to Lai.
5. Attached as Exhibit B is a true and accurate copy of an English translation of CN201017882Y to Lai (“the CN201017882Y to Lai Translation”).
6. The CN201017882Y to Lai Translation is a true and accurate translation of CN201017882Y to Lai from Chinese to English.
7. All statements made herein of my own knowledge are true, and all statements made on information and belief are believed to be true. Further, I am aware that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001. I declare under penalty of perjury that the foregoing is true and correct.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on August 29, 2023, at New York, New York.



TAN JIA YUN