Title

~~PIXEL UNIT STRUCTURE~~DISPLAY DEVICE AND MANUFACTURING METHOD THEREOF

Background of the Invention

1. Field of the Invention

[0001] The present invention relates to a pixel unit structure and a manufacturing method thereof, and more specifically, the present invention relates to a pixel unit structure with a display medium module and a manufacturing method thereof.

2. Description of the Prior Art

[0002] With the advancement of technology, users are getting more demanding about visual display and require display devices with the advantages of compactness, excellent display quality, large-sized panel, high color saturation, low cost and low power consumption.

[0003] Existing display devices may be categorized into self-luminous and non-self-luminous ones. Liquid crystal display (LCD) devices are one of the primary non-self-luminous flat panel display devices, wherein the amount of light passing through a liquid crystal medium is modulated by controlling the voltage of the upper and lower electrodes of the liquid crystal medium. The effect of color display is achieved with further employment of a color filter layer, a polarizer and some optical films.

[0004] Self-luminous flat panel display devices may be categorized into field emissive display, plasma display, electroluminescent display, organic light-emitting diode display and so on. In an organic light-emitting diode display (OLED), light-emitting polymers are deposited between an upper electrode layer and a lower electrode layer. With further employment of a conductive layer of electrons and holes, light is generated by means of an external electric field which moves the carriers and causes the electrons and holes to re-combine. In comparison, an organic light-emitting diode display device is characterized by its wide viewing angle, fast responding speed, thin

15 in a pixel unit structure 1E may be from (but not limited to) the following: square, rectangular, fan-shaped, triangular, trapezoid, round, polygonal, irregular, or one of the combinations thereof. In the present embodiment, the display medium module 15 is arranged as a hexagon for an example.

[0067] Further, as Figure 7C shows, the pixel unit structures 1E may be arranged as independently assembled and disassembled, i.e. none of the elements of any pixel unit structure 1E is connected and integrated to any of the elements of another pixel unit structure 1E. Thus, each of the pixel unit structures 1E may be independently disassembled from the housing structure 31. Furthermore, the pixel unit structure 1E is capable of independently being disassembled from the housing structure 31 through a connection between the active switching element 13 and the housing structure 31. Therefore, when one of the pixel unit structures 1E is damaged, it may be disassembled and replaced with a good pixel unit structure 1E.

[0068] Please refer to Figure 8, showing an application schematic view of the display device 2 of Figure 7A. The display device 2 may not only be applied to electronic products such as computer and mobile phone but also to any product that may be equipped with a display function such as a transportation vehicle, wear products, building and billboard. Take a car 100 for an example, the display device 2 may serve as a rear car light 101 of the car 100 for showing images 100A of various kinds of driving information (e.g. turning, changing lanes, slowing down, speeding up, speed per hour, warning and the like) to other vehicles or pedestrians. In addition, with the functional element 21 of the pixel unit structure 1E, the display device 2 may be equipped with the functions of displacement sensing, hygrothermal sensing, acoustic sensing, electromagnetic sensing, image capturing and the like for sensing various environmental information outside the car.

[0069] Besides serving as a rear car light 101 of the car 100, the display device 2 may also serve as a front car light (not shown in the drawing), a dashboard (not shown in the drawing) and the like of the car 100 or may be disposed on the glass of the car 100. In