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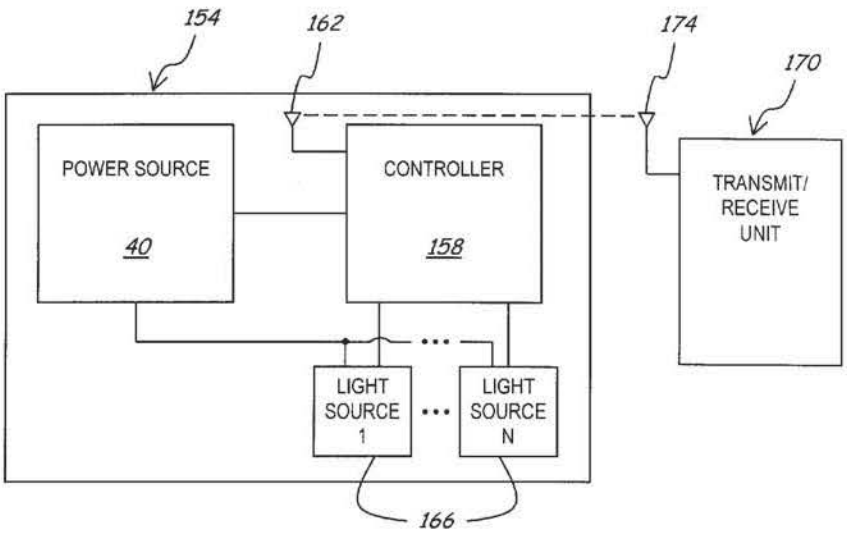
(54) Title: LIGHT UNITS WITH COMMUNICATIONS CAPABILITY



(57) Abstract: Light units are provided that have a number of different features. In one aspect a light unit comprising a substrate and a display interconnected to the substrate is provided. The substrate includes a power source, a plurality of light elements, a controller operably interconnected to the power source and light elements that activates the light elements to one or more illumination states, and a communications module operably interconnected to the controller and power source. The communications module receives wireless communications and provides information from the wireless communications to the controller, wherein the controller activates the light elements according to information received from the communications module when the communications module receives information related to the activation of the light elements. Other aspects are also disclosed.

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Light Units With Communications Capability

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. Patent Application Serial No. 11/219,164 filed on September 2, 2005 entitled "SUBSTRATE WITH LIGHT DISPLAY" and also claims the benefit of U.S. Provisional Patent Application Serial No. 60/804,224 filed on June 8, 2006 entitled "SUBSTRATE WITH LIGHT DISPLAY," and U.S. Provisional Patent Application Serial No. 60/868,465 filed on December 4, 2006 entitled "LIGHT UNITS WITH COMMUNICATIONS CAPABILITY," the entire disclosures of which are enclosed herein by reference in their entirety.

FIELD

[0002] The present invention is directed to display devices, and in particular, to displays devices that include at least one light emitting diode element.

BACKGROUND

[0003] Displays are used in numerous applications, and take numerous different forms, and serve the purpose of conveying a message to a viewer or onlooker. Such a message may be an advertisement, information, or any other particular message desired to be conveyed. For example, retail establishments such as grocery stores and convenience stores generally use numerous different types of displays both for advertising and for conveying information. The displays may be shelf tags indicating a product and a price, floor displays, window displays, and numerous others. Similarly, posters may be used as displays for numerous types of establishments, including retail establishments, theaters, food service establishments, and many public or governmental displays to convey various types of information. Furthermore, numerous different types of vehicle-mounted displays exist, such as bumper stickers, window stickers, and others. Other types of vehicle-mounted displays include advertising displays mounted on the interior and/or exterior portions of vehicles, including taxi vehicles and public transit vehicles such as buses and trains. Displays may also be fixed to benches, buildings, street or lampposts, and hanging banners, to name but a few examples.

[0004] Generally, such displays are static displays that are printed in a fixed manner. For example, a poster may have a printed display portion including text and/or graphics for use in an advertising promotion. These displays are often intended for use only during a

limited time period, and thus it is desirable to keep the cost of such displays as low as possible. Such displays are generally shipped in tubes with the poster or other display rolled up, which may then be unrolled and mounted an appropriate display mounting device, such as a frame, and displayed in the appropriate location. Such displays generally do not have any lights or other visual elements therein that change the nature of the display. The same is true for most vehicle displays, with a bumper sticker, or advertisement on a public transit vehicle, having a static and fixed printed display.

[0005] Other types of displays, however, are lighted displays with dynamic changing display elements. Such displays include moving banners, neon lights, and video displays, to name a few. Such displays are traditionally plugged into a power source to provide the necessary electrical power to operate the display. As such, these lighted displays have relatively high power requirements and are relatively expensive. Furthermore, such displays are also relatively expensive to ship and install as compared to a comparable fixed or static display. Additionally, the location of such displays is generally limited to a location that is in relatively close proximity to a power source. However, such displays are quite popular and have a large market due to the dynamic nature of the display that provides for a visual stimulus to onlookers thus drawing their attention, and often making a more effective display. Furthermore, such displays may be visible in low light conditions further enhancing the viewing ability at night or in other low light situations. Many other displays are simply lighted with a front light or a back light that simply serves to illuminate the static printed display.

[0006] While such displays have a high degree of success and utility, as evidenced by many years of very successful use, the displays are generally quite specialized and limited to a specific type of use. Accordingly, many types of displays, such as lighted or dynamic displays, are not able to be used in many applications.

SUMMARY

[0007] The present disclosure provides for light units may be provided with a number of different features. In one aspect, the present disclosure provides a light unit, comprising a substrate and a display interconnected to the substrate. The substrate in this aspect includes a power source, a plurality of light elements, a controller operably interconnected to the power source and light elements that activates the light elements to one or more illumination states, and a communications module operably interconnected to the controller and power source. The communications module receives wireless communications and provides information

from the wireless communications to the controller, wherein the controller activates the light elements according to information received from the communications module when the communications module receives information related to the activation of the light elements. The power source may comprise a solar cell, a battery, and/or a battery and solar cell wherein the solar cell recharges the battery.

[0008] The communications module in some aspects is operable to send information to one or more other light units. The communications module may communicate through radio frequency communications, and may include a ZIGBEE communication module. In other aspects, the substrate includes a positioning component that is operable to determine a position of the light unit. The light unit in such aspects may also include a panic button that, when actuated by a user, is operable to activate the positioning component and controller. The controller then activates one or more light elements, receives position information from the positioning component, and transmits a help message and position information through the communications module. The light unit may also include a surveillance device that collects surveillance information from an area in the proximity of the light unit, and the controller may transmit at least a portion of the surveillance information through the communications module.

[0009] Other aspects of the disclosure provide a light unit in which the substrate further comprises a flexible expandable material having the power source, light elements, controller, and communications module mounted thereto. The light unit may be buoyant in water when the flexible expandable material is inflated with a fluid having a density lower than water.

[0010] Still further aspects of the disclosure provide a light unit in which the display comprises a right half display layer and a left half display layer, and the substrate comprises a right half substrate and a left half substrate, and wherein the right and left half substrate and display layers are coupled together to form the light unit. In some additional aspects of the disclosure, at least one of the light units, power supply, controller, and communications module are removable and/or replaceable on the substrate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Fig. 1 is a front perspective view of a display of an embodiment of the invention;

[0012] Fig. 1A is a front perspective view of a display of another embodiment of the invention;

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