



Illumination and Image Projection Device for Vehicular Head-up Display Systems

Problem

Head-up display (HUD) systems in vehicles are in increasingly high demand because they can project a substantial amount of critical information onto the windshield, enabling drivers to obtain information more quickly and naturally, and thus significantly enhancing driving safety and efficiency.

In conventional HUD systems, light sources, such as halogen lamps and arc lamps, provide sufficient luminance to project on the windshield an image which can easily be recognized by the driver even in conditions of bright sunlight. However, these conventional systems also have major disadvantages such as high power consumption, short lifetimes and high temperatures.

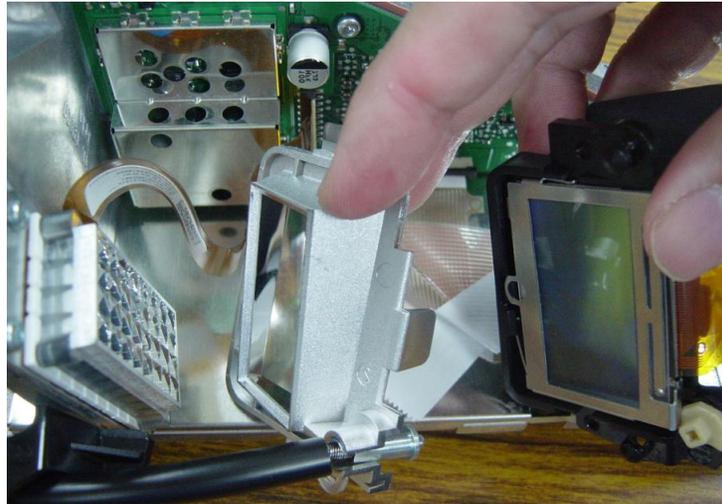
Light-emitting diode (LED)-based light source devices for HUD systems are now available. These devices have lower power consumption, longer life and lower thermal energy. In order for LEDs to be a viable alternative to halogen and arc lamps, multiple light sources must be deployed to provide the required luminance. One major challenge with such multiple-LED systems is ensuring the uniformity of the light sources. Optical systems comprised of multiple lenses have been developed to tackle this problem. However, these systems are typically complicated in design and comparably expensive because each lens requires great precision in fabrication.

Therefore, there is a need for a cost-effective illumination and image projection device using multiple LEDs (or similar light sources) to provide high-intensity and uniform parallel light for a HUD system.

360ip Partner's Solution

360ip's Partner has developed an illumination and image projection device with multiple light sources that achieves uniformity through a tapered light guide which projects the light onto a liquid-crystal display (LCD). Since the system uses multiple light-emitting modules, various low power-consuming light sources, such as LEDs, organic light emitting diodes, laser diodes, electro-luminescence devices, field emission displays and cold cathode fluorescence lamps, can be used. For simplicity, we refer below to this group of light sources as LEDs.

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Two kinds of tapered light guides play the roles of guiding and shaping the light from the LEDs and overlaying them on the LCD while avoiding the use of complicated and expensive optical lenses and enhancing the uniformity of the light displayed on the LCD. This also increases the lifetime of the illumination and image projection device compared to competing technologies. In addition, since less thermal energy is generated, materials such as plastic can be used for the optical lenses, thus reducing the fabrication cost.

In summary, the benefits of the Partner's technology as compared to alternative solutions include:

- **Long lifetime**
- **Low fabrication cost**
- **Uniform illumination**
- **High efficiency**
- **Use of low power luminescence**
- **Flexibility to use a variety of light sources**

360ip is seeking interested parties for the licensing and commercialization of this technology-based product.

For additional information, contact:

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