dark. A 3 color pixel would consist of 3 separate elements with air gaps corresponding to the three primitive colors red, green and blue.

[0015] The pixel memory is made possible by the hysteresis effect inherent in the MEMS membrane. Once the metallic membrane has been pulled down, it requires less energy to hold it. Because of this, Iridigm displays can be addressed passively, thus greatly reducing the complexities as well as the costs of the addressing hardware. The down side of this is that each color pixel can only display 8 distinct colors, owing to the on-off nature of the addressing process. To render gray scales, multiple pixels of varying sizes are needed. Another way is to use pulse width modulation to obtain a limited range of gray scale. Both will increase the cost of the driver hardware dramatically.

[0016] Iridigm display does not rely on backlight for illumination, instead, because of its high optical efficiency, it can use reflected ambient light for illumination. This makes it extremely power efficient. It is also extremely thin, even thinner than OLED in overall thickness. In fact, all essential functionality, including light modulation, addressing, and color selection, is contained within one micron of thin films, making it the thinnest display technology.

[0017] Iridigm displays are light weight, low power consuming, and sharp. Their brightness depends on the level of ambient lighting. Since the color is produced by interference, there is a viewing angle dependence of the perceived color. Nevertheless, the usable viewing angles are still larger than those of the LCD technology. The main drawbacks are the lack of backlighting, the durability (MEMS technology generally suffers from stiction problem, a problem associated with the tendency of the MEMS parts to stick together or slide poorly. The problem gets worse with age), and the scalability to very large scale displays.

[0018] All the aforementioned display technologies suffer from the problems of high initial setup cost as well as high recurrent production costs. Moreover, none of the technologies mentioned scale up very well to very large screen sizes. Both LCD and plasma display technology require very large glass panels with numerous spacers to maintain uniform thickness throughout the entire panel in order to scale up to very large display sizes. In the case of plasma displays, such large glass panels also need to withstand the enormous atmospheric pressure, which escalates the cost of manufacturing such panels. For LCD displays, the cost of active matrix addressing elements goes up dramatically with the screen size. Although screen sizes of 102" for PDP (plasma display panel) and 82" for LCD have been demonstrated, their production costs will likely dissuade most people from buying them.

[0019] Both OLED and Iridigm technologies are promising because of their thinness and wide viewing angles. However, both still have to overcome their shortcomings in the area of durability and scalability. For small molecule OLED displays, the individual diodes are built up by chemical vacuum deposition technique, which requires very large vacuum chanbers to make a giant screen display. For polymer OLED displays, it is possible to use inkjet printing, screen printing, or any of the contact technologies used for ordinary inks. Potentially, with large format inkjet printers, it would be possible to print extremely large polymer OLED displays. However, the printing has to be done in the absence of moisture and oxygen, and the low conductivity of inkjet printed circuit board means that additional process is needed to enhance the conductivity when the display is scaled to such large sizes. Even if all these can be overcome, the need to scale up the active matrix control electronics remains a problem which OLED shares with active matrix LCD displays.

[0020] Building a large Iridigm display would be extremely difficult since it would require a large scale MEMS manufacturing. Current MEMS production technology can only produce small MEMS devices. Even if such a display screen could be made, the pulse width modulation used in the passive matrix addressing is still a major problem since as the screen size increases; the MEMS light switches also become proportionally larger. Since the response time of the MEMS switch is directly proportional to the size of the MEMS elements, for very large screen sizes the MEMS switches would fail to keep up with the fast pulse width modulation necessary to provide the gray scale resolution needed for high quality display images.

[0021] All the aforementioned display technologies require the implementation of some forms of advanced addressing methods in order to provide image and video qualities that meet the need of the consumers. Such implementations are inherently costly and do not scale up well to large displays. Most also require large glass panels where the distances between the two adjacent panels must be kept constant using strategically placed spacers with very small tolerance for deviation. The cost of manufacturing and assembling such panels for large displays proves prohibitive. None of the display technologies discussed above is particularly power efficient except the one by Iridigm, which currently can't be scaled up to large screen sizes. As screen sizes increase, thermal management becomes a big issue which may necessitate the inclusion of active cooling at some stage.

[0022] Therefore, is a need to provide a large screen direct-view display device that does not require expensive and complicated schemes to address the individual pixels.

[0023] There exits a need a to provide a large screen direct-view display device that does not require large glass substrates or backlight and can be sheathed in thin, flexible plastics.

[0024] There exits a need a to provide a flexible direct-view giant screen display device that can be bent and rolled for easy transport and stowage.

[0025] There exits a need a to provide a giant screen direct-view display device that is easy and low cost to manufacture.

[0026] And there exits a need a to provide a large screen display device that consumes low power and can dissipate heat naturally without the need of complicated thermal management schemes.

SUMMARY

[0027] In one embodiment, there is provided a device and method for displaying images and high speed videos in a large format. The device includes a row array of color laser diodes in a repeated pattern of red, green and blue, or R, G, B, order. The laser diodes can emit red, green, and blue lights