

produced to have a defined viewing angle; that is the contrast ratio of the pixel is optimal for a certain scope of viewing angle. The control of viewing angle of a pixel is found commonly in the market. For example displays which are intended to be located higher than the intended viewer have a viewing angle pointing down.

[0031] Different specified viewing angle pixels which have different viewing angles are interlaced within the adapted display layer. Preferably two images will be presented to the viewer or viewers. Those images are interlaced and displayed on the adapted display layer. The images are interlaced in such a way that the specified viewing angle pixels separate out or ‘unbraids’ the constituent images the interlaced image displayed on the adapted display layer and presents the constituent images at different viewing angles. Using this technique, the observer will see one of the constituent images from one viewing angle and the other constituent image from another viewing angle.

[0032] Accordingly in a further aspect of the present invention may broadly be said to consist in a multi view display for viewing different images at specified viewing angles comprising a multi view display comprising:

[0033] i) an adapted display layer for the display of images wherein said adapted display layer comprises:

[0034] ii) at least two different specified viewing angle pixels which are interlaced

[0035] iii) an un-braiding viewing angle manipulation means;

[0036] such that when at least two images are interlaced and displayed on said adapted display layer, each constituent image of the interlaced image is presented to the viewing angle or viewing angles as determined by the viewing angle of the interlaced specified viewing angle pixels in combination with the unbraiding viewing angle manipulation means.

[0037] In this embodiment the combination of a manipulation means preferably an interlaced privacy film or light directing means is used in combination with interlaced specified viewing angle pixels. The combination of these mechanisms allows greater control of the viewing angle to which images are presented.

[0038] Accordingly in a further aspect of the present invention may be broadly said to consist in a multi-layer multi view display for displaying different images at specified viewing angles comprising:

[0039] i) at least two display layers for the display of images, said display layers being substantially planar and at least in part overlapping, wherein display layer(s) overlapping another display layer are selectively transparent;

[0040] ii) an un-braiding viewing angle manipulation means acting upon at least one of the display layers and thereby manipulating the viewing angle of images displayed on the display layer(s) behind it;

[0041] such that when at least two images are be interlaced and a display layer which the un-braiding viewing angle manipulation means is acting upon, each constituent image of the interlaced image displayed on said layer(s) (which the un-braiding viewing angle

manipulation means is acting upon) is presented at the viewing angle or viewing angles as determined by the un-braiding viewing angle manipulation means.

[0042] In one preferred embodiment of the present invention the display device is made up of a two layered multi-layer display, being backlit, with each layer being selectively transparent. In between those layers an interlaced lens with a triangle strip pattern with particular viewing angles acting as a viewing angle manipulation means acts on the rear most layer. The interlaced lens allows the constituent images of an interlaced image displayed on the rear screen to be seen from the viewing angles specified by the interlaced lens.

[0043] A conventional non-layered, non-compensated colour liquid crystal display, contrast ratio decreases until to a crossover point at which the image inverts when viewed from outside the optimal viewing angle. This results in images being “washed out” and beyond the cut-off point these colours invert completely with black changing to white.

[0044] In the multi-layered setup used in a multi view display as described here-in the display is required to be transparent. Hence in a real life scenario—the multi-layered multi view display is used in a car—if the driver was looking at the rear image layer with a viewing direction of about 60 degrees in the plane perpendicular to the floor and parallel with the horizontal and with the front image layer with an optimal viewing direction of -60 degrees in said plane then the driver will be able to see the image on the rear image layer and not on the front image layer. Conversely, the passenger, sitting to the other side of the display, can see only information from the front image layer. Hence the passenger can view entertainment only and the driver can view navigation only. Thus limited viewing angle, which was previously considered as a disadvantage in the industry, combined with multiple layered displays can be used to multiplex images to multiple viewers which is an unexpected advantage.

[0045] Accordingly in a further aspect of the present invention may be broadly said to consist in a multi-layer multi view display for displaying different images at specified viewing angles comprising:

[0046] at least two display layers for the display of images, said display layers being substantially planar and at least in part overlapping, wherein display layer(s) overlapping another display layer are selectively transparent;

[0047] where in at least one of the display layers is an adapted display layer comprising pixels which are specified viewing angle pixels;

[0048] such that images displayed on the at least one adapted display layer will be presented to the viewing angle of the specified viewing angle pixels.

[0049] Preferably the images displayed on the at least one adapted display layer have a different viewing angle to the images displayed on the other (non-adapted) display layer(s).

[0050] In a preferred embodiment of the present invention the display device is made up of a two layered multi-layer display, being backlit, with each layer being selectively transparent. Both display layers are adapted display layers,