

Title (en)

MICROMIRROR ELEMENTS, PACKAGE FOR THE MICROMIRROR ELEMENTS, AND PROTECTION SYSTEM THEREFOR

Title (de)

MIKROSPIEGELELEMENTE, GEHÄUSE FÜR DIE MIKROSPIEGELELEMENTE UND ZUGEHÖRIGES SCHUTZSYSTEM

Title (fr)

ELEMENTS DE MICROMIROIR, BOITIER DESTINE A CES ELEMENTS DE MICROMIROIR ET SYSTEME DE PROTECTION ASSOCIE

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Application

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- US 22924600 P 20000830
- US 73244500 A 20001207

Abstract (en)

[origin: WO0212925A2] In order to minimize light diffraction along the direction of switching and more particularly light diffraction onto the acceptance cone of the collection optics, in the present invention, micromirrors are provided which are not rectangular. Also, in order to minimize the cost of the illumination optics and the size of the display unit of the present invention, the light source is placed orthogonal to the rows (or columns) of the array, and/or the light source is placed orthogonal to a side of the frame defining the active area of the array. The incident light beam, though orthogonal to the sides of the active area, is not however, orthogonal to any substantial portion of sides of the individual micromirrors in the array. Orthogonal sides cause incident light to diffract along the direction of micromirror switching, and result in light 'leakage' into the 'on' state even if the micromirror is in the 'off' state. This light diffraction decreases the contrast ratio of the micromirror. The micromirrors of the present invention result in an improved contrast ratio, and the arrangement of the light source to micromirror array in the present invention results in a more compact system. Another feature of the invention is the ability of the micromirrors to pivot in opposite direction to on and off positions (the on position directing light to collection optics), where the movement to the on position is greater than movement to the off position. A further feature of the invention is a package for the micromirror array, the package having a window that is not parallel to the substrate upon which the micromirrors are formed. One example of the invention includes all the above features.

[origin: WO0212925A2] Micromirrors are provided which are not rectangular in order to minimize light diffraction along a direction of switching and into the acceptance cone of collection optics (115). A light source (114) is placed orthogonal to rows and columns of an array (94) though not orthogonal to any substantial portion of the sides of the micromirrors in the array. The micromirrors of the present invention result in an improved contrast ratio and the light source position results in a more compact system. The micromirrors have the ability to pivot in opposite direction to on and off positions where the movement to the on position is greater than the movement to the off position.

[origin: WO0212925A2] A micro-mirror (24) is connected to a substrate (10) via a post (21), a hinge (18c), a post (16c) and metal areas (12a) and an array of the micro-mirrors is disposed in a rectangular shape with a capability of rotation around a switching axis between on and off states corresponding to pixels in a viewed image. Light is directed from a source to the mirrors non-perpendicularly to at least two sides of each mirror, while reflected light is received from collection optics. Independent claims are included for an array of movable micro-mirrors, for a method of positioning an image on a target, for a method of spatially modulating light beams, for an optical micro-mirror element, for a packaged micro-electromechanical device and for a method of making a micro-mirror.

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Citation (search report)

- [X] US 5696619 A 19971209 - KNIPE RICHARD L [US], et al
- [X] US 5659374 A 19970819 - GALE JR RICHARD OVID [US], et al
- See references of WO 0212925A2

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