[0014] FIG. **5**B illustrates one exemplary timing diagram for row and column signals that may be used to write the frame of FIG. **5**A.

[0015] FIGS. **6**A and **6**B are system block diagrams illustrating an embodiment of a visual display device comprising a plurality of interferometric modulators.

[0016] FIG. **7**A is a cross section of the device of FIG. **1**.

[0017] FIG. **7**B is a cross section of an alternative embodiment of an interferometric modulator.

[0018] FIG. **7**C is a cross section of another alternative embodiment of an interferometric modulator.

[0019] FIG. **7**D is a cross section of yet another alternative embodiment of an interferometric modulator.

[0020] FIG. **7**E is a cross section of an additional alternative embodiment of an interferometric modulator.

[0021] FIG. **8**A is a side cross-sectional view of an embodiment of a MEMS device in a relaxed or unactuated state.

[0022] FIG. **8**B is a side cross-sectional view of the MEMS device shown in FIG. **8**A in an actuated or driven state.

[0023] FIG. **9**A is a side cross-sectional view of another embodiment of a MEMS device in a relaxed or unactuated state.

[0024] FIG. **9**B is a side cross-sectional view of the MEMS device shown in FIG. **9**A in an actuated or driven state.

[0025] FIG. **10**A is a side cross-sectional view of an additional embodiment of a MEMS device in a relaxed or unactuated state.

[0026] FIG. **10**B is a side cross-sectional view of the MEMS device shown in FIG. **10**A in an actuated or driven state.

[0027] FIG. **11**A is a side cross-sectional view of a portion of an embodiment of a MEMS device in the actuated or driven state before a voltage is applied to a third electrode.

[0028] FIG. **11**B is a close-up, side cross-sectional view of the portion of the MEMS device shown in FIG. **11**A after the voltage is applied to the third electrode.

[0029] FIGS. **12**A-**12**D are side cross-sectional views of different embodiments of a reflective element in a MEMS device.

[0030] FIGS. **13**A-**13**D are side cross-sectional views of additional embodiments of MEMS devices in the relaxed state.

[0031] FIG. **14** is a side cross-sectional view of an embodiment of a MEMS device in the actuated or driven state.

DETAILED DESCRIPTION OF EMBODIMENTS

[0032] The following detailed description is directed to certain specific embodiments of the invention. However, the invention can be embodied in a multitude of different ways. In this description, reference is made to the drawings wherein like parts are designated with like numerals throughout. As will be apparent from the following description, the embodiments may be implemented in any device that is configured to display an image, whether in motion (e.g., video) or stationary (e.g., still image), and whether textual or pictorial. More particularly, it is contemplated that the embodiments may be implemented in or associated with a variety of electronic devices such as, but not limited to, mobile telephones, wireless devices, personal data assistants (PDAs), hand-held or portable computers, GPS receivers/navigators, cameras, MP3 players, camcorders, game consoles, wrist watches, clocks, calculators, television monitors, flat panel displays, computer monitors, auto displays (e.g., odometer display, etc.), cockpit controls and/or displays, display of camera views (e.g., display of a rear view camera in a vehicle), electronic photographs, electronic billboards or signs, projectors, architectural structures, packaging, and aesthetic structures (e.g., display of images on a piece of jewelry). MEMS devices of similar structure to those described herein can also be used in non-display applications such as in electronic switching devices.

[0033] Some embodiments of a MEMS device may comprise a movable element, such as a mirror or a deformable mechanical layer, which moves between a first position in which the moveable element is in contact with a portion of the device and a second position in which the moveable element is not in contact with the portion of the device. While in the first position, an adhesive force (e.g., stiction) may be generated between the movable element and the contact portion. Accordingly, it may be advantageous to provide MEMS devices and methods of operation in which the adhesive force may be at least partially reduced or counteracted while the moveable element is in the first position. In certain embodiments, the MEMS device comprises one or more electrodes configured to at least partially reduce or counteract the adhesive force on the movable element. In one embodiment, voltages may be applied to the one or more electrodes to provide an electrostatic force that at least partially counteracts the adhesive force. In other embodiments, a time-varying voltage may be used to elastically deform or oscillate the movable element so as to reduce the contact area over which the adhesive force is generated. In certain embodiments, the time-varying voltage may cause the movable element to vibrate or resonate such that the adhesive force is reduced.

[0034] One interferometric modulator display embodiment comprising an interferometric MEMS display element is illustrated in FIG. **1**. In these devices, the pixels are in either a bright or dark state. In the bright ("on" or "open") state, the display element reflects a large portion of incident visible light to a user. When in the dark ("off" or "closed") state, the display element reflects little incident visible light to the user. Depending on the embodiment, the light reflectance properties of the "on" and "off" states may be reversed. MEMS pixels can be configured to reflect predominantly at selected colors, allowing for a color display in addition to black and white.

[0035] FIG. **1** is an isometric view depicting two adjacent pixels in a series of pixels of a visual display, wherein each pixel comprises a MEMS interferometric modulator. In some embodiments, an interferometric modulator display comprises a row/column array of these interferometric modulators. Each interferometric modulator includes a pair of reflective layers positioned at a variable and controllable distance from each other to form a resonant optical cavity with at least one variable dimension. In one embodiment, one of the reflective layers may be moved between two positions. In the first position, referred to herein as the relaxed position, the movable reflective layer is positioned at a relatively large distance from a fixed partially reflective layer. In the second position, referred to herein as the actuated position, the movable reflective layer is positioned more closely adjacent to the partially reflective layer. Incident light that reflects from the two layers interferes con-