ration in order to affect a topography change at the dynamic surface **121**. In one example, the change in the alterable portions **122** can be driven by shape changeable actuators that form the shape changeable nodes **128**. Shape changeable actuators **140** (which can be electromechanical devices) of FIG. **14** can be capable of moving the alterable portions **122** between an unactuated state and an actuated state. The actuated state can for example include raising and lowering of the alterable portion **122**. The motion can be analog or binary. In analog, varying heights can be achieved. In binary, the motion can be simply up or down a predetermined distance.

[0125] In a specific example of FIGS. **11** and **12**, the actuators **140** of FIG. **14** can generally correspond to a solenoid. The solenoid can for example include a moving piston that can be coupled to the alterable portions. In the example of FIG. **11**, the nodes **118** can have an unactuated state in which their pistons can be fully seated in their housings. In addition, the nodes **118**-*a* can be actuated such that the piston pushes against their corresponding portions **112**-*a* of the surface **111** and raise the corresponding portions above the initial surface. The other portions of the surface **111** can remain unaltered in the initial surface when their corresponding nodes **118** are not actuated. In the example of FIG. **12**, changeable nodes **128** can have an unactuated state in which their pistons can be partially moved out of their housings to form the initial surface above the housings. The nodes **128**-*a* can be actuated such that the pistons can pull away from their corresponding portions **122**-*a* of the surface **121** and lower the corresponding portions below the initial surface, where the other portions corresponding to unactuated nodes can remain unaltered in the initial surface. Of course, the examples shown in FIGS. **11** and **12** can be combined such that some of the portions can be raised, some of the portions can be lowered and some of the portions can remain unchanged. It should also be appreciated that any number of the portions can remain unchanged or changed depending on the needs of the system. That is, the example is not limited to moving pairs of adjacent portions as shown.

[0126] In one embodiment, the lower side of the alterable portions can be limited to raising no higher than the upper side of an adjacent portion so as to prevent gaps from forming therebetween. This can for example be controlled in software. Furthermore, in some cases, the interface between adjacent portions can include an elastic seal which can allow movement therebetween while preventing a gap from forming. In one example, the under side of the portions can include a single seal layer that can cover the entire surface (excluding the attachment points) and therefore the interfaces.

[0127] In the examples of FIGS. **10** through **12**, the nodes **108**, **118**, **128**, respectively, can be proximate to their corresponding dynamic surfaces **101**, **111**, **121** that can be raised or lowered by the underlying nodes. The dynamic surfaces can be replaced with a flexible membrane or a shape changeable membrane proximate to the nodes. Alternatively, both the nodes and the dynamic surfaces can be replaced with the shape changeable membrane that itself can change shape to alter the user interface.

[0128] In some embodiments, the dynamic surface can be fixed to unchangeable nodes to prevent either upward or downward altering in those areas. For example, some nodes can be unchanged and can have the surface fixed to these nodes to prevent altering. Unchangeable nodes can be interspersed with changeable nodes, depending on the needs of the system.

[0129] FIG. **13** illustrates an exemplary circuit for changing the user interface topography using electromechanical devices according to embodiments of the invention. The circuit can for example generally be applied to the mechanism shown in FIGS. **10** through **12**. The circuit **130** can include application specific integrated circuit (ASIC) **137** that can be operatively coupled to printed circuit board (PCB) **136** that can be operatively coupled to a plurality of the changeable nodes (or actuators) **108**, **118**, **120** of FIGS. **10** through **12**, respectively. In FIG. **13**, the PCB **136** and/or the ASIC **137** can cause a stimulus, e.g., an electrical current, to be applied to the nodes **139**. The nodes **139** can include housing **134**, movable piston **135**, and a solenoid that can be actuated by the stimulus to move the piston out of the housing. The pistons **135** of the unstimulated nodes **139** can remain stationary. The connections between the PCB **136** and/or ASIC **137** and the nodes **139** can have, for example, individual switches for each node, where a particular node's switch can close when the node is selected to be actuated so as to transmit the stimulus and can remain open when not. The PCB **136** and the ASIC **137** can include one or more processors and memory for executing software and/or firmware to change the topography of the user interface according to embodiments of the invention.

[0130] In some embodiments, the user interface can be incorporated into a touch sensitive device. It is to be understood, however, that the user interface can be incorporated into any device capable of changing the topography of the user interface.

[0131] FIG. **15** illustrates an exemplary user interface of a touch screen that can change topography according to embodiments of the invention. This embodiment can generally correspond to the embodiment shown in FIGS. **10** through **12**. In the example of FIG. **15**, touch screen **150** can have nodes **158** that can change the topography of the touch screen surface **151**. The nodes **158** can for example include alterable portions **152**, which can include a touch sensing layer and a display layer. The alterable portions **152** can be configured to raise and lower via an actuator, e.g., an electromechanical device, forming the nodes **158**. The actuators can raise or lower the portions **152** in order to form raised and/or lower regions of the surface. These regions can correspond to a virtual button, e.g., an "OK" button being displayed on the touch screen. As such, the user can be provided a physical way for identifying the location of the virtual button, and more particularly the region for activating the virtual button. For example, the user can identify the boundary by feeling a raised or lowered edge. As shown, portions **152**-*a* and corresponding nodes **158** can be located where the virtual button could be (symbolically illustrated by "X" in the figure). A cross section at line A-A shows the nodes **158** and the surface portions **152** in the touch screen.

[0132] FIG. **16** illustrates an exemplary user interface of a touch screen that can change topography to form a virtual button according to embodiments of the invention. In the example of FIG. **16**, touch screen **160** can form virtual push button **163**. The cross section at line A-A shows nodes **168**-*a* that can raise alterable portions **162**-*a* of user interface surface **161**, thereby forming the push button and informing the user of the location of the push button to be touched. Display nodes (coinciding with nodes **162**) can display the user interface element "OK" to indicate the push button's function. In some cases, the actuators, e.g., electromechanical devices, forming the nodes **168**-*a* can be configured to provide feed-