cover the end of the tube **158** and contain the fluid **154**. Hydraulic pressure would deform the membrane or bellows. This would enable the membrane or bellows to also function as the deformable member **60**. Again, the spring may be used to deform the member **60** so that acceleration in both the +Y and −Y direction (or both the +X and −X direction) can be detected by sensing an increase or decrease in deformation.

FIGS. **13**A-B provide a flow diagram of a method **100** for detecting accelerations that are applied to the accelerometer module. The user may select to enter an accelerometer mode of operation on a touch screen device (step **102**), such as by pressing an accelerometer mode icon. When the accelerometer module is physically installed, the touch screen detects contact in certain predetermined regions to indicate that an accelerometer module has been properly coupled relative to the touch screen (step **104**). During use of the accelerometer, the method monitors the contact area of the deformable member associated with each of three components of acceleration in a Cartesian coordinate system (step **106**).

If a change is detected in the contact area associate with the "X" axis (step **108**), then it is determined whether the contact area increased or decreased (step **110**). If the contact area increased, then there is an indication of an acceleration in the positive X direction (+X) in an amount that is proportional to the extent of increase in the contact area (step **112**). However, if the contact area decreased, then there is an indication of an acceleration in the negative X direction (−X) in an amount that is proportional to the extent of decrease in the contact area (step **114**). The function of this proportionality may be stored in the application software.

If a change is detected in the contact area associate with the "Y" axis (step **118**), then it is determined whether the contact area increased or decreased (step **120**). If the contact area increased, then there is an indication of an acceleration in the positive Y direction (+Y) in an amount that is proportional to the extent of increase in the contact area (step **122**). However, if the contact area decreased, then there is an indication of an acceleration in the negative Y direction (−Y) in an amount that is proportional to the extent of decrease in the contact area (step **124**). The function of this proportionality may be stored in the application software.

Furthermore, if a change is detected in the contact area associate with the "Z" axis (step **128**), then it is determined whether the contact area increased or decreased (step **130**). If the contact area increased, then there is an indication of an acceleration in the positive Z direction (+Z) in an amount that is proportional to the extent of increase in the contact area (step **132**). However, if the contact area decreased, then there is an indication of an acceleration in the negative Z direction (−Z) in an amount that is proportional to the extent of decrease in the contact area (step **134**). The function of this proportionality may be stored in the application software.

Having detected whether there was any acceleration in the X, Y or Z directions, and having determined the extent of the acceleration where detected, the method provides the resulting X, Y and Z components of acceleration to an application program for further use (step **136**). If the user wants to exit the accelerometer mode (step **138**), then the process ends. Otherwise, the method continues in the accelerometer mode and returns to step **106** to continue monitoring the contact areas on the touch screen. Application programs, such as pedometers or video games, may use the output of the method in a wide variety of ways.

The terms "comprising," "including," and "having," as used in the claims and specification herein, shall be considered as indicating an open group that may include other elements not specified. The terms "a," "an," and the singular forms of words shall be taken to include the plural form of the same words, such that the terms mean that one or more of something is provided. The term "one" or "single" may be used to indicate that one and only one of something is intended. Similarly, other specific integer values, such as "two," may be used when a specific number of things is intended. The terms "preferably," "preferred," "prefer," "optionally," "may," and similar terms are used to indicate that an item, condition or step being referred to is an optional (not required) feature of the invention.

While the invention has been described with respect to a limited number of embodiments, those skilled in the art, having benefit of this disclosure, will appreciate that other embodiments can be devised which do not depart from the scope of the invention as disclosed herein. Accordingly, the scope of the invention should be limited only by the attached claims.

What is claimed is:

1. A method of sensing acceleration, comprising:

disposing a deformable member adjacent a touch screen surface;

directing an acceleration to push the deformable member against the touch screen surface to cause a change in a degree of elastic deformation of the deformable member; and

sensing a change in a contact area between the deformable member and the touch screen surface as a result of the change in the degree of elastic deformation.

2. The method of claim **1**, further comprising:

applying a substantially constant biasing force to push the deformable member against the touch screen surface to cause a first extent of elastic deformation of the deformable member; and

directing an acceleration to oppose the substantially constant biasing force and result in a second extent of elastic deformation of the deformable member that is less than the first extent of elastic deformation.

3. The method of claim **2**, further comprising:

physically limiting the acceleration that is directed to push the deformable member against the touch screen to be an acceleration along a defined axis; and

identifying the direction of the acceleration along the defined axis by determining whether the contact area increased or decreased.

4. The method of claim **3**, further comprising:

identifying the relative magnitude of the acceleration by determining the extent of the change in the contact area.

5. The method of claim **4**, wherein the step of identifying the relative magnitude of the acceleration by determining the extent of the change in the contact area, includes using a correlation between contact area and acceleration.

6. The method of claim **5**, further comprising:

combining the direction and relative magnitude of the acceleration along each of three coordinate axis in order to determine the direction and relative magnitude of an overall acceleration.

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