trollable skin texture surface **104** also includes other controllable surfaces **106** and **108** that are for aesthetic purposes and are controlled to change the tactile configuration of a non-user interface portion of the portable electronic device, such as another area of the outer portion of the device. As shown in this particular example, the portable electronic device **100** is a flip phone having a foldable housing portion **110** that pivots about a pivot mechanism **112** as known in the art. The foldable housing portion **110** may also include a keypad and controllable skin texture surface as desired. The controllable skin texture surface **104** is controlled to change the tactile configuration of a portion of the skin texture surface to, in this example, raise respective portions of the skin texture to provide a tactilely detectable keypad and other tactile and/or aesthetic features. In one example, the controllable skin texture surface **104** may be flat when, for example, the phone is in a standby mode, but the controllable skin texture surface **104** is controlled to activate portions thereof to provide raised keys for a keypad when an incoming wireless call is detected and is controlled to become flat (deactivated) when a call ends. Other input information is also used to control the actuation/deactuation of the controllable skin texture as described below.

[0034] FIG. **2** illustrates in block diagram form the portable electronic device of FIG. **1** or any other suitable portable electronic device such as a laptop computer, portable Internet appliance, portable digital media player, or any other suitable portable electronic device. As shown, control logic **200** changes a tactile configuration of a portion of the controllable skin texture surface **104** (and/or **106** and **108**) by producing control information **204** (e.g., digital or analog signals) in response to at least any one of a received wireless signal, a battery level change condition such as a low battery condition, based on an incoming call or message, based on information from a proximity sensor, sound sensor, light sensor or other environmental sensor generally designated as **202**, or data representing a user of the device, such as the input via a microphone and a voice recognition module that recognizes the user's voice, or a password or passcode entered by a user indicating a particular user, or data representing completion of a user authentication sequence such as the entry of a password and PIN or any other suitable authentication process as desired. Other data may also be used such as control data based on a pressure sensor, humidity sensor, shock sensor or vibration sensor. State changes may also be used to control the texture such as, but not limited to, radio signal strength, device orientation, device configuration (e.g., flip open, phone mode vs. audio playback mode vs. camera mode), a grip of a user or data representing a change of state of a program executing on a device, including the state of a program executing on another device connected via a wired or wireless connection such as a server or another portable device. Other incoming data representing other incoming signals may include, for example, changing or controlling the texture based on an incoming SMS, email or instant message, a proximity to a radio source such as an RFID reader, a Bluetooth™ enabled device, a WIFI access point, or response from an outgoing signal such as a tag associated with an RFID. Other data that may be suitable for triggering or controlling the activation of the texture may include data representing the completion of a financial transaction, completion of a user initiated action such as sending a message, downloading a file or answering or ending a call, based on a timeout period, based on the location of the device relative to some other device or an absolute location such as a GPS location, status of another user such as the online presence of another instant message user, availability of a data source such as a broadcast TV program or information in a program guide, based on game conditions such as a game that is being played on the device or another networked device, based on for example, other modes of data being output by the device such as the beat of music, patterns on a screen, actions in a game, lighting of a keypad, haptic output, or other suitable data. By way of example, the control logic **200** may raise portions of the controllable skin texture surface **104** to represent keys, in response to sensor output information **206** such as the sensor **202** detecting the presence of a user, based on a sound level detected in the room, or output based on the amount of light in a room.

[0035] For example, if the light level in a room decreases to a desired level as sensed by a light sensor, the sensor **202** outputs the sensor output information **206** and the control logic **200** may activate the controllable skin texture surface **104** to provide a raised keypad feature so that the user can feel the keypad surface in a dark room since there is not much light to see the keypad. In addition if desired, light source(s) such as LEDs located underneath the controllable skin texture surface may also be illuminated under control of the control logic in response to the light sensor detecting a low light level in the vicinity of the device. A sound sensor may also be used, for example, to control which portions of the controllable skin texture surface are used depending upon, for example, the amount of noise in a room. In addition, the control logic **200** may control the controllable skin texture surface **104**, **106** or **108** to provide a pulsating action, or any other suitable tactile configuration as desired based on the sensor output information. For example, the device of FIG. **1** may have controllable skin texture surface **104** configured about the exterior of the device so that when the skin texture surface is activated (e.g., raised) in certain portions, the device appears to be pulsating, like a heartbeat, or may provide a sequential raising and lowering of certain portions of the skin texture to provide a user desired movement, such as an animated pattern.

[0036] The control logic **200** may be implemented in any suitable manner including a processor executing software module that is stored in a storage medium such as RAM, ROM or any other suitable storage medium which stores executable instructions that when executed, cause one or more processors to operate as described herein. Alternatively, the control logic as described herein, may be implemented as discrete logic including, but not limited to, state machines, application specific integrated circuits, or any suitable combination of hardware, software or firmware.

[0037] In one example, the controllable skin texture surface **104**, **106**, and **108** may include a mechanical actuation structure that is coupled to a flexible skin structure that moves in response to moving of the mechanical actuation structure, a hydraulic actuation structure that is coupled to a flexible skin structure that moves in response to movement of fluid in the hydraulic actuation structure, and expandable gas actuation structure that is coupled to a flexible skin structure that moves in response to movement of gas in the expandable gas actuation structure and a shape memory alloy actuation structure that is coupled to a flexible skin structure that moves in response to movement of a metal alloy in the shape memory alloy actuation structure, or any suitable combination thereof.

[0038] FIGS. **3-7** illustrate various examples of a mechanical actuation structure that is used to move a flexible skin