keyboard. In such an embodiment, when the user interacts with a section of the touch-screen that overlays one of the keys of the virtual keyboard, the touch-screen will send an interface signal to processor **110** corresponding to that user interaction. Based on the interface signal, processor **110** will determine that the user pressed one of the keys on the virtual keyboard. This functionality allows the user to interact with other icons and virtual objects on the display **116**. For example, in some embodiments the user may flick the touch-screen to move a virtual ball or turn a virtual knob.

[0043] As shown in FIG. **1**, processor **110** is also in communication with an actuation system comprising one or more actuators **118**, a suspension system for each actuator, and electrical power and control wiring for each actuator. In some embodiments, messaging device **102** comprises more than one actuation system. Processor **110** is configured to determine a haptic effect and transmit a haptic signal corresponding to the haptic effect to actuator **118**. In some embodiments, the haptic effect comprises a vibrotactile texture felt on the surface of display **116**, touch-sensitive interface **114**, or the housing of messaging device **102**. In some embodiments, determining a haptic effect may comprise a series of calculations to determine the haptic effect. In other embodiments, determining the haptic effect may comprise accessing a lookup table to determine the appropriate haptic effect. In still other embodiments, determining the haptic effect may comprise a combination of lookup tables and algorithms.

[0044] In some embodiments, determining the haptic effect may comprise a haptic map. In such an embodiment, determining the haptic effect may comprise mapping the display signal to the actuators. For example, the display signal may comprise a plurality of pixels, each of the pixels associated with a color. In such an embodiment, each pixel may be associated with the color red, green, or blue; each color may further be associated with an intensity, for example, an intensity of 1-8. In such an embodiment, determining the haptic effect may comprise assigning a haptic effect to each color. In some embodiments, the haptic effect may comprise a direction and intensity of operation, for example, in one embodiment the haptic signal may be configured to cause a rotary actuator to rotate clockwise at one-half power. In some embodiments, the intensity of operation may be associated with the intensity of the color. Once processor **110** determines a haptic effect, it transmits a haptic signal comprising the haptic effect. In some embodiments, processor **110** may assign a haptic effect to only some of the pixels in the display signal. For example, in such an embodiment, the haptic effect may be associated with only a portion of the display signal.

[0045] In some embodiments, processor **110** may utilize a haptic map to determine the haptic effect and then output the display signal to display **116**. In other embodiments, processor **110** may determine the haptic effect using a haptic map, and then not transmit the display signal to display **116**. In such an embodiment, the display **116** may stay dark, or off, while actuator **118** is outputting the haptic effect. For example, in such an embodiment, processor **110** may receive a display signal from a digital camera associated with messaging device **102**. In some embodiments, in order to conserve battery power, the user may have deactivated display **116**. In such an embodiment, the processor may utilize a haptic map to provide the user with a haptic effect simulating a texture on the surface of the display. This texture may be used to alert the user when the camera is in focus, or when some other event has occurred. For example, processor **110** may use facial recognition software to determine haptic effects simulating textures at locations on display **116** that would be associated with faces if display **116** were activated.

[0046] In some embodiments, processor **110** may determine the haptic effect based at least in part on a user interaction or trigger. In such an embodiment, processor **110** receives an interface signal from touch-sensitive interface **114**, and determines the haptic effect based at least in part on the interface signal. For example, in some embodiments, processor **110** may determine the haptic effects based on the location of the user interaction detected by touch-sensitive interface **114**. For example, in one embodiment, processor **110** may determine a haptic effect that simulates the texture of a virtual object that the user is touching on display **116**. In other embodiments, processor **110** may determine the intensity of the haptic effect based at least in part on the interface signal. For example, if touch-sensitive interface **114** detects a high pressure user interaction, processor **110** may determine a high intensity haptic effect. In another embodiment, if touch-sensitive interface **114** detects a low pressure user interaction, processor **110** may determine a low intensity haptic effect. In still other embodiments, processor **110** may determine the intensity of the haptic effect based at least in part on the speed of the user interaction. For example, in one embodiment, processor **110** may determine a low intensity haptic effect when touch-sensitive interface **114** detects low speed user interaction. In still other embodiments, processor **110** may determine no haptic effect, unless it receives an interface signal associated with user interaction from touch-sensitive interface **114**.

[0047] Once processor **110** determines the haptic effect, it transmits a haptic signal associated with the haptic effect to actuator **118**. Actuator **118** is configured to receive a haptic signal from processor **110** and generate the haptic effect. Actuator **118** may be, for example, a piezoelectric actuator, an electric motor, an electro-magnetic actuator, a voice coil, a shape memory alloy, an electro-active polymer, a solenoid, an eccentric rotating mass motor (ERM), or a linear resonant actuator (LRA). In some embodiments, actuator **118** may comprise a plurality of actuators, for example an ERM and an LRA.

[0048] In some embodiments of the present invention, the haptic effect generated by actuator **118** is configured to simulate a texture that the user feels on the surface of touch-sensitive interface **114** or display **116**. This texture may be associated with the graphical user interface shown on display **116**. For example, display **116** may show an icon comprising the shape of a rock. In such an embodiment, processor **110** may determine a haptic effect configured to simulate the texture of a rock on the surface of touch-sensitive interface **114**. Then, processor **110** will transmit a haptic signal associated with the haptic effect to actuator **118**, which outputs the haptic effect. For example, when actuator **118** receives the haptic signal, it may output a vibration at a frequency configured to cause the surface of the touch-sensitive interface to comprise the texture of a rock. In other embodiments, actuator **118** may be configured to output a vibration at a frequency that causes the surface of display **116** or touch-sensitive interface **114** to comprise the texture of: water, ice, leather, sand, gravel, snow, skin, fur, or some other surface. In some embodiments, the haptic effect may be output onto a different portion of messaging device **102**, for example onto its housing. In some embodiments, actuator **118** may output a multitude of vibrations configured to output multiple textures at the