

8. The device of claim 7 wherein a frequency of vibration of the particular one or more of the one or more tactile pixels is related to a state of a gesture made with the touch pad.

9. The device of claim 1 wherein the device is configured such that the one or more of the tactile pixels are positioned to provide tactile feedback to a user and/or receive input from a user in response to a gesture entered with the touch pad.

10. The device of claim 1 wherein the device is configured such that a particular one or more of the one or more of the tactile pixels are positioned to act as buttons associated with specific command inputs to the device.

11. The device of claim 10 wherein the touch screen is configured to display information identifying the specific command inputs proximate the particular one or more tactile pixels.

12. The device of claim 1, further comprising a sensor configured to register a change in orientation of the device.

13. The device of claim 12 wherein the device is configured such that a particular one or more of the one or more of the tactile pixels actuate between the first and second positions in response to a change in orientation of the device.

14. The device of claim 10 wherein the device is configured to be used as game device, phone, portable media player, email device, web browser device or navigation device.

15. The device of claim 10 wherein the device is configured to be used as a game device and wherein the device is configured to change a state of the one or more tactile pixels in response to a change in a game state or game event.

16. The device of claim 1, further comprising a communication interface adapted to facilitate communication between the device and one or more other devices.

17. The device of claim 1, wherein the device is configured such that a state of the one or more tactile pixels changes in response to a change in state of one or more other devices in communication with the hand-held electronic device.

18. An electronic device, comprising:

a touch screen disposed on a major surface of the electronic device;

a processor operably coupled to the touch screen; and

wherein the touch screen comprises an array of tactile pixels, wherein each of the tactile pixels in the array includes an actuatable portion coupled to an actuator and a sensor, wherein the transducer is coupled to the processor, wherein the actuator is configured to actuate in response to instructions from the processor and wherein the sensor is configured to generate signals as inputs to one or more programs executed by the processor when pressure is applied to the actuatable portion, wherein the actuatable portion is actuatable by the actuator between first and second positions in response to execution of one or more instructions by the processor, wherein a tactile feel of the actuatable portion in the first position is different from the tactile feel of the actuatable portion in the second position.

19. A method for operating a hand-held device having a touch screen and one or more tactile pixels disposed proximate the touch screen, wherein each of the one or more tactile pixels includes an actuatable portion coupled to an actuator and a sensor, wherein the actuatable portion is actuatable by the actuator between first and second positions, wherein a tactile feel of the actuatable portion in the first position is different from the tactile feel of the actuatable portion in the second position, the method comprising:

tracking user input with the touch screen;

determining a state of the touch screen;

changing a state of the one or more tactile pixels in response to detection of a predetermined state of the display.

20. The method of claim 19 wherein tracking the user input includes tracking motion of a user's finger with the touch screen.

21. The method of claim 19 wherein determining the state of the touch screen includes determining whether the user has entered a particular gesture on the touch screen.

22. The method of claim 19 wherein the user input to the touch screen corresponds to user input to a video game.

23. The method of claim 22 wherein the predetermined state reflects a change in state of the video game or one or more particular game events.

24. The method of claim 19 wherein the predetermined state corresponds to a change in state of one or more other devices in communication with the hand-held device.

25. The method of claim 19 wherein the hand-held device includes a tilt sensor and the predetermined state corresponds to a change in state of the tilt sensor.

26. The method of claim 25 wherein changing the state of the tactile pixels includes selectively actuating one or more particular pixels in response to a tilting of the hand-held device sensed by the tilt sensor in a way that simulates a bubble level.

27. The method of claim 19 wherein changing the state of the tactile pixels includes selectively actuating one or more particular pixels such that they can be felt by a user and configuring the particular pixels to act as a scroll wheel for the hand-held device.

28. The method of claim 19 wherein changing the state of the tactile pixels includes selectively actuating one or more particular pixels proximate a command shown on the touch screen such that the one or more particular pixels can be felt by a user and configuring the particular pixels to act as a button to execute the command with the hand-held device.

29. The method of claim 28, further comprising vibrating the one or more particular tactile pixels.

30. The method of claim 19 wherein changing the state of the tactile pixels includes selectively actuating one or more particular pixels such that the one or more particular pixels can be felt by a user when the user reaches a scroll limit with the touch screen.

\* \* \* \* \*