TACTILE TOUCH SCREEN FOR ELECTRONIC DEVICE

FIELD OF TECHNOLOGY

[0001] The present application relates to touch screen devices and arrangements for providing tactile response for such touch screen devices.

BACKGROUND

[0002] Portable electronic devices have gained widespread use and can provide a variety of functions including, for example, telephonic, electronic messaging and other personal information manager (PIM) application functions. Portable electronic devices can include several types of devices including mobile stations such as simple cellular telephones, smart telephones, wireless PDAs, and laptop computers with wireless 802.11 or Bluetooth capabilities. These devices run on a wide variety of networks from data-only networks such as Mobitex and DataTAC to complex voice and data networks such as GSM/GPRS, CDMA, EDGE, UMTS and CDMA2000 networks.

[0003] Devices such as PDAs or smart telephones are generally intended for handheld use and easy portability. Smaller devices are generally desirable for portability. A touch screen input/output device is particularly useful on such handheld devices as such handheld devices are small and are therefore limited in space available for user input and output devices. Further, the screen content on the touch screen input/output devices can be modified depending on the functions and operations being performed.

[0004] Touch screen input/output devices are constructed of a display, such as a liquid crystal display, with a touch-sensitive overlay. These input/output devices suffer from inherent disadvantages relating to user interaction and response, however. In particular, such touch screen input/output devices fail to provide a user-desirable tactile feedback for positively indicating input, providing a poor user-experience.

[0005] Improvements in input/output devices are therefore desirable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] Embodiments of the present application will now be described, by way of example only, with reference to the attached Figures, wherein:

[0007] FIG. **1** is a top view of a portable electronic device according to one exemplary embodiment, with certain hidden features shown in ghost outline for the purpose of illustration;

[0008] FIG. **2** is a simplified sectional side view of the portable electronic device of FIG. **1** (not to scale);

[0009] FIG. **3** is a block diagram of certain components, including certain internal components, of the portable electronic device of FIG. **1**;

[0010] FIG. **4** is a simplified sectional side view of the portable electronic device of FIG. **1** (not to scale), showing a force applied to a point on a touch screen display;

[0011] FIG. **5** is a simplified sectional side view of the portable electronic device of FIG. **1** (not to scale), showing a force applied to a point on the touch screen display;

[0012] FIG. **6** is a simplified section side view of a portable electronic device according to another embodiment (not to scale);

[0013] FIG. **7** is a simplified sectional side view of the portable electronic device of FIG. **6** (not to scale), showing a force applied to a point on the touch screen display;

[0014] FIG. **8** is a simplified sectional side view of the portable electronic device of FIG. **6** (not to scale), showing a force applied to another point on the touch screen display;

[0015] FIG. **9** is a simplified sectional side view of the portable electronic device according to yet another embodiment (not to scale);

[0016] FIG. **10** is a top view of a portion of the portable electronic device of FIG. **9**;

[0017] FIG. **11** is a simplified sectional side view of the portable electronic device according to the embodiment shown in FIG. **9** (not to scale), showing a force applied to a point on the touch screen display;

[0018] FIG. **12** is a simplified sectional side view of a portable electronic device according to still another embodiment (not to scale); and

[0019] FIG. **13** is a perspective view of a portion of the portable electronic device of FIG. **10**.

DETAILED DESCRIPTION

[0020] It will be appreciated that for simplicity and clarity of illustration, where considered appropriate, reference numerals may be repeated among the figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the embodiments described herein. However, it will be understood by those of ordinary skill in the art that the embodiments described herein may be practiced without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as not to obscure the embodiments described herein. Also, the description is not to be considered as limiting the scope of the embodiments described herein. It will be understood that the exemplary views, particularly those shown in FIGS. **2** and **4** to **13** are not scale and are provided for the purpose of explanation and understanding.

[0021] The embodiments described herein generally relate to a portable electronic device having a display. Examples of portable electronic devices include mobile, or handheld, wireless communication devices such as pagers, cellular phones, cellular smart-phones, wireless organizers, personal digital assistants, wirelessly enabled notebook computers and the like.

[0022] The portable electronic device may be a two-way communication device with advanced data communication capabilities including the capability to communicate with other portable electronic devices or computer systems through a network of transceiver stations. The portable electronic device may also have the capability to allow voice communication. Depending on the functionality provided by the portable electronic device, it may be referred to as a data messaging device, a two-way pager, a cellular telephone with data messaging capabilities, a wireless Internet appliance, or a data communication device (with or without telephony capabilities). The portable electronic device may also be a portable device without wireless communication capabilities as a handheld electronic game device, digital photograph album, digital camera and the like.

[0023] Referring to FIGS. **1** to **3**, an electronic device, which in the present embodiment is a portable electronic device, is indicated generally by the numeral **20**. The electronic device **20** includes a base **22** and a touch screen display