moving a point of contact with the click wheel **114** (e.g., where the amount of movement of the point of contact is measured by its angular displacement with respect to a center point of the click wheel). The click wheel **114** may also be used to select one or more of the displayed icons. For example, the user may press down on at least a portion of the click wheel **114** or an associated button. User commands and navigation commands provided by the user via the click wheel **114** may be processed by the click wheel controller **158** as well as one or more of the modules and/or sets of instructions in memory **102**. For a virtual click wheel, the click wheel **114** and click wheel controller **158** may be part of the display system **112** and the display controller **156**, respectively. For a virtual click wheel, the click wheel may be either an opaque or semitransparent object that appears and disappears on a display in response to user interaction with the device. In some embodiments, a virtual click wheel is displayed on the touch screen of a portable electronic device and operated by user contact with the touch screen. In other embodiments, a virtual click wheel is displayed on a computer screen and operated with a mouse, touch pad, or other pointing device.

[0035] The device **100** also includes a power system **162** for powering the various components. The power system **162** may include a power management system, one or more power sources (e.g., battery, alternating current (AC)), a recharging system, a power failure detection circuit, a power converter or inverter, a power status indicator (e.g., a light-emitting diode (LED)) and any other components associated with the generation, management and distribution of power in portable devices.

[0036] The device **100** may also include one or more optical sensors **164**. FIG. **1** shows an optical sensor coupled to the peripherals interface **118**. The optical sensor **164** may include charge-coupled device (CCD) or complementary metal-oxide semiconductor (CMOS) phototransistors. The optical sensor **164** receives light from the environment, projected through one or more lens, and converts the light to data representing an image. In conjunction with an imaging module **142**, the optical sensor **164** may capture still images or video.

[0037] In some embodiments, the software components stored in memory **102** may include an operating system **126**, a communication module (or set of instructions) **128**, a contact/motion module (or set of instructions) **130**, a graphics module (or set of instructions) **132**, and one or more applications (or set of instructions) **136**. The applications module **136** may include a telephone module (or set of instructions) **138**, an address book module (or set of instructions) **140**, an imaging module (or set of instructions) **142**, and/or a music player module (or set of instructions) **144**.

[0038] The operating system **126** (e.g., Darwin, RTXC, LINUX, UNIX, OS X, WINDOWS, or an embedded operating system such as VxWorks) includes various software components and/or drivers for controlling and managing general system tasks (e.g., memory management, storage device control, power management, etc.) and facilitates communication between various hardware and software components.

[0039] The communication module **128** facilitates communication with other devices over one or more external ports **124** and also includes various software components for handling data received by the RF circuitry **108** and/or the external port **124**. The external port **124** (e.g., Universal Serial Bus (USB), FIREWIRE, etc.) is adapted for coupling directly to other devices or indirectly over a network (e.g., the Internet, wireless LAN, etc.). In some embodiments, the external port is a multi-pin (e.g., 30-pin) connector that is the same as, or similar to and/or compatible with the 30-pin connector used on iPod (trademark of Apple Computer, Inc.) devices.

[0040] The contact/motion module **130** may detect contact with the click wheel **114** (in conjunction with the click wheel controller **158**) and/or a touch screen in the display system **112** (in conjunction with the display controller **156**). The contact/motion module **130** includes various software components for performing various operations related to detection of contact, such as determining if contact has occurred, determining if there is movement of the contact and tracking the movement across the click wheel **114** and/or a touch screen in the display system **112**, and determining if the contact has been broken (i.e., if the contact has ceased). Determining movement of the point of contact may include determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (a change in magnitude and/or direction) of the point of contact. In some embodiments, the contact/motion module **130** and the display controller **156** also detects contact on a touchpad.

[0041] The graphics module **132** includes various known software components for rendering and displaying graphics on the display system **112**, including components for changing the intensity of graphics that are displayed. Note that the term "graphics" includes any object that can be displayed to a user, including without limitation text, web pages, icons (such as user-interface objects including soft keys), digital images, videos, animations and the like.

[0042] In addition to the telephone module **138**, the address book module **140** and/or the imaging module **142**, the one or more applications **136** may include any applications installed on the device **100**, including without limitation, a browser, email, instant messaging, text messaging, word processing, keyboard emulation, widgets, JAVA-enabled applications, encryption, digital rights management, voice recognition, voice replication, location determination capability (such as that provided by the Global Positioning System (GPS)), etc.

[0043] In conjunction with the RF circuitry **108**, the audio circuitry **110**, the speaker **111**, the microphone **113**, the display system **112**, the display controller **156**, the click wheel **114** and/or the click wheel controller **158**, the telephone module **138** may be used to enter a sequence of characters corresponding to a telephone number, access one or more telephone numbers in the address book **140**, modify a telephone number that has been entered, dial a respective telephone number, conduct a conversation and disconnect or hang up when the conversation is completed. The telephone module **138** may also be used to receive a second call while a first call is already ongoing, without disconnecting the first call, or conduct a conference call.

[0044] In conjunction with the display system **112**, the display controller **156**, the click wheel **114** and/or the click wheel controller **158**, the address book module **140** may be used to manage an address book or contact list **144**, including adding a name to the address book **144**, deleting a name from the address book **144**, associating a telephone number or other information with a name, associating an image with a name, categorizing and sorting names, and so forth.

[0045] In conjunction with the display system **112**, the display controller **156**, the click wheel **114**, the click wheel controller **158**, and the optical sensor(s) **164**, the imaging module **142** may be used to capture still images or video