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(54) **HANDHELD COMPUTER WITH POP-UP USER INTERFACE**

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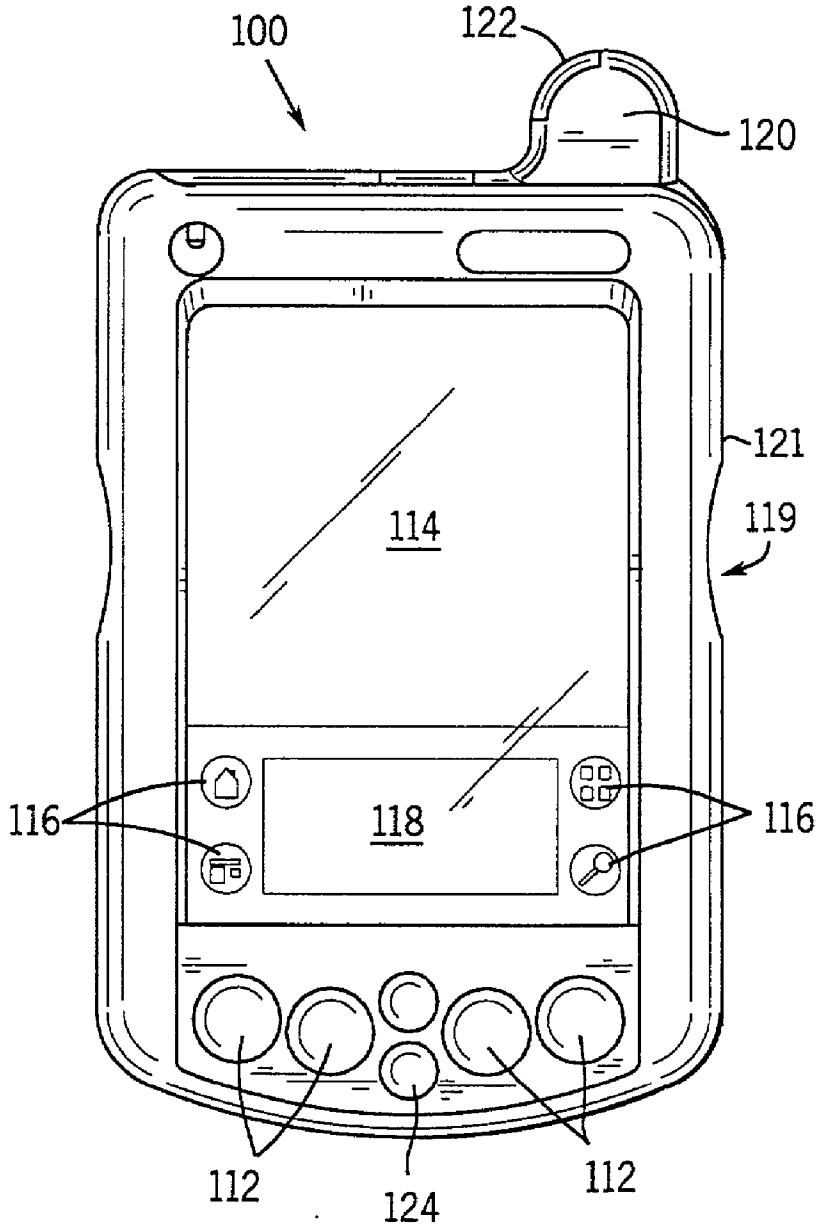
(57) **ABSTRACT**

A method and system for inputting text information to a handheld computer is provided. A graffiti area or keyboard can be displayed in response to a switch. The switch can be a pressure activated switch on a side of the device.



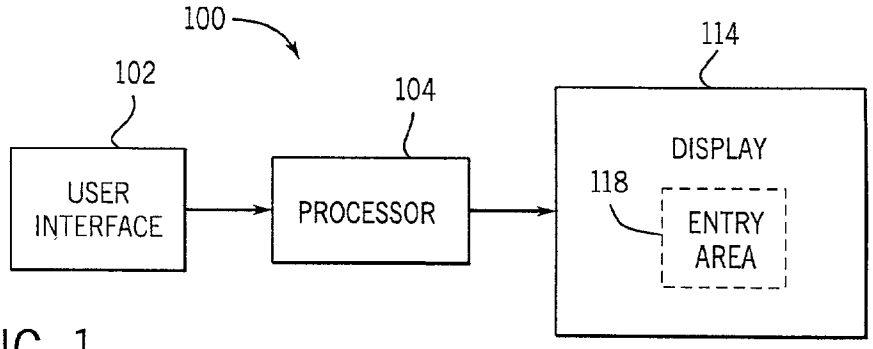


FIG. 1

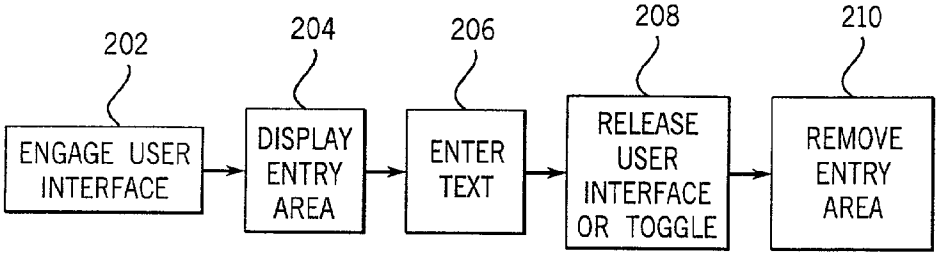


FIG. 2

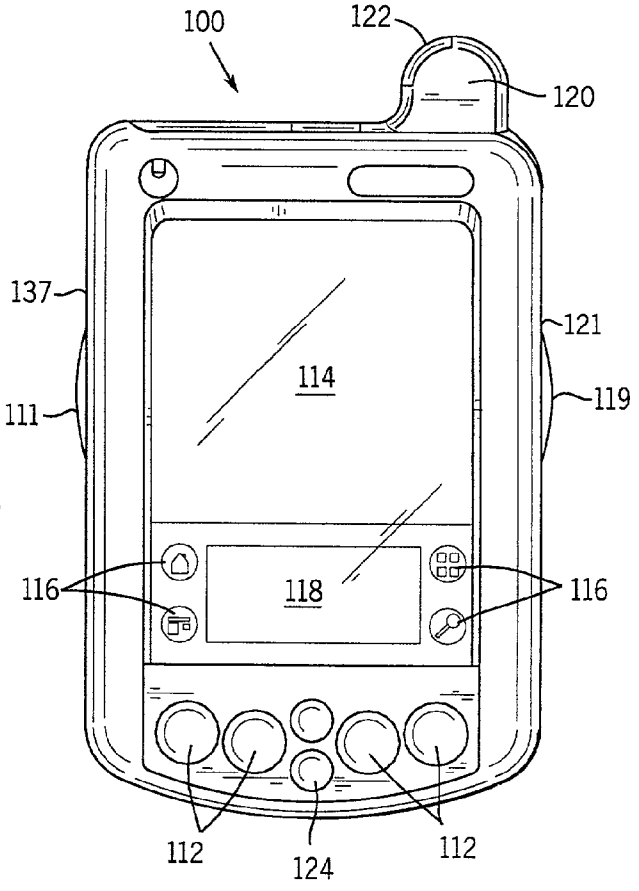
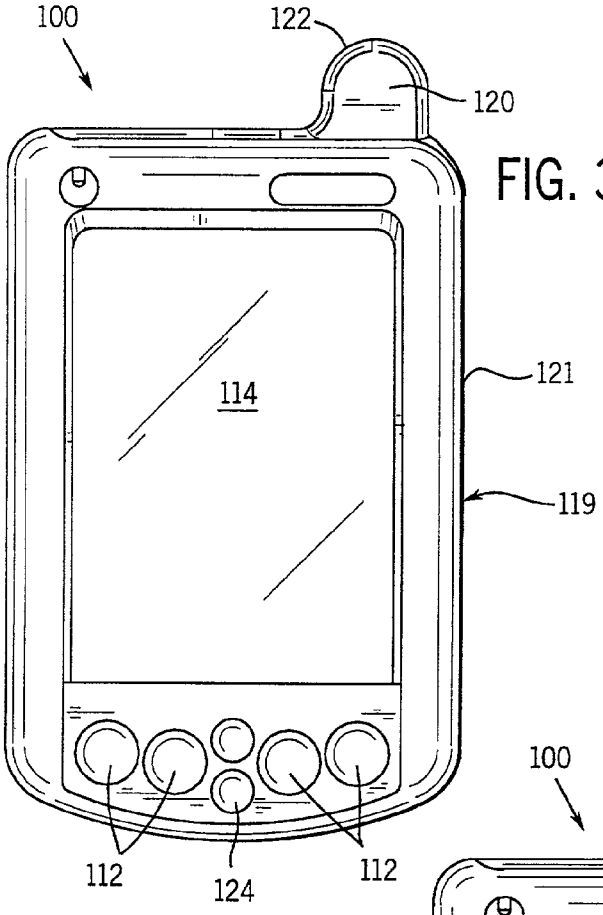


FIG. 9


100
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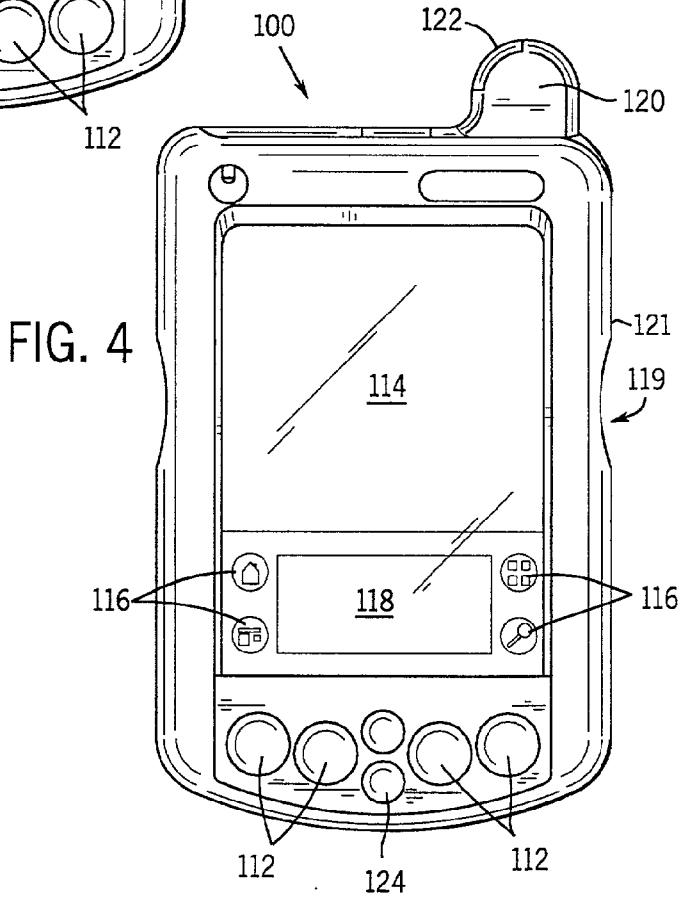
112

FIG. 3


100
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112

FIG. 4

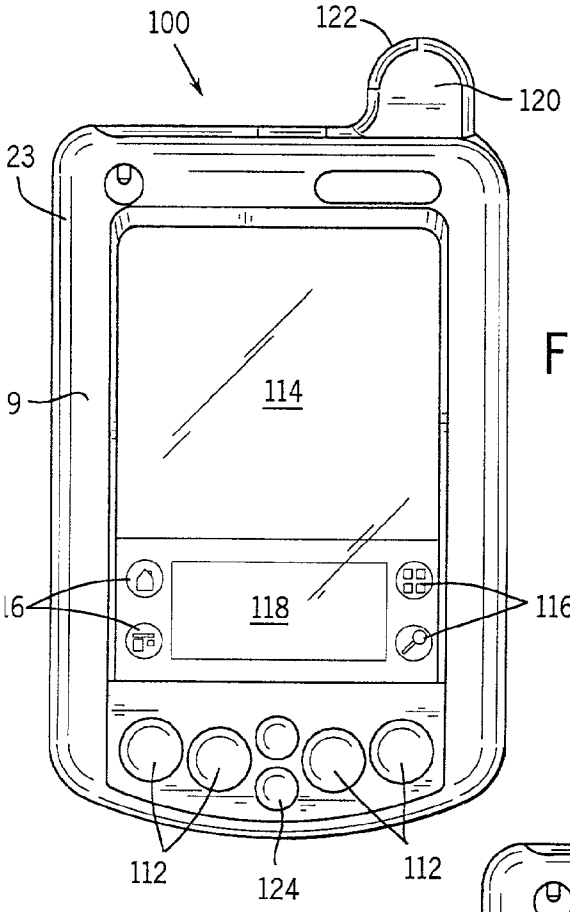
100
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FIG. 5

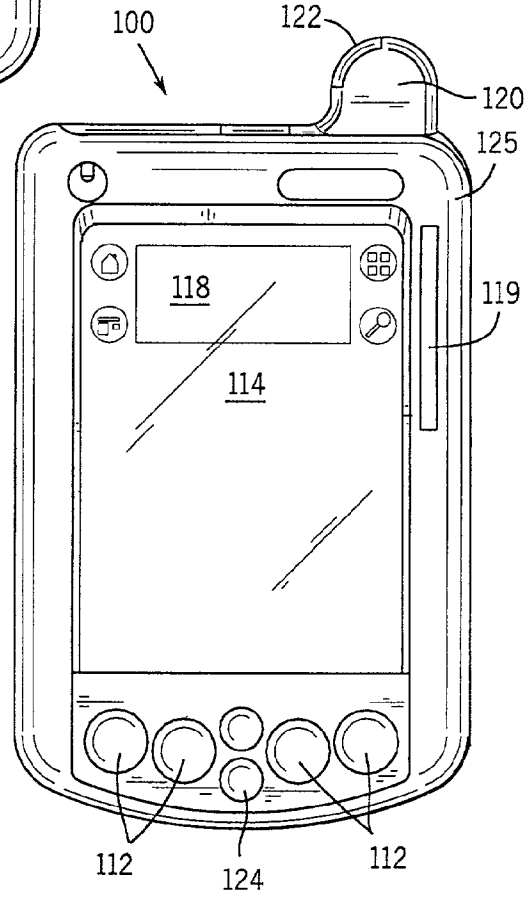
100
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FIG. 6

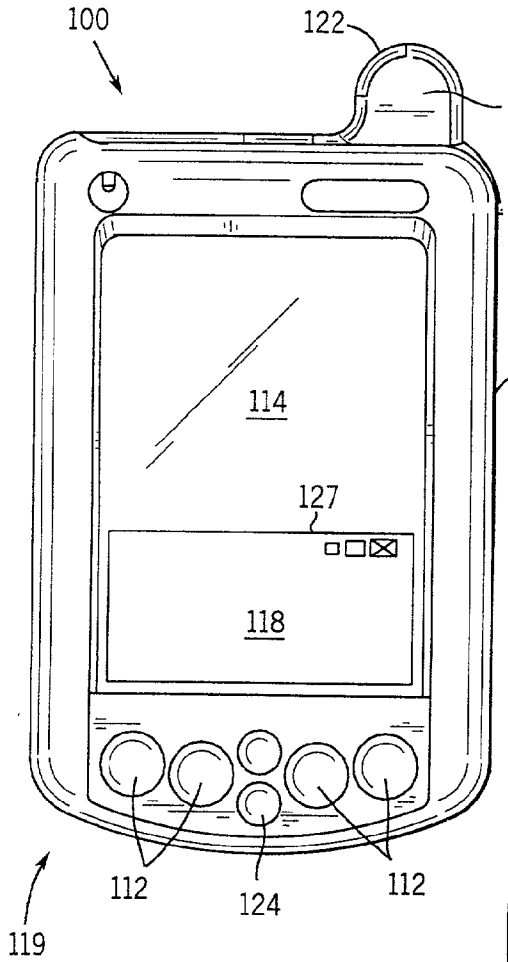
100
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FIG. 7

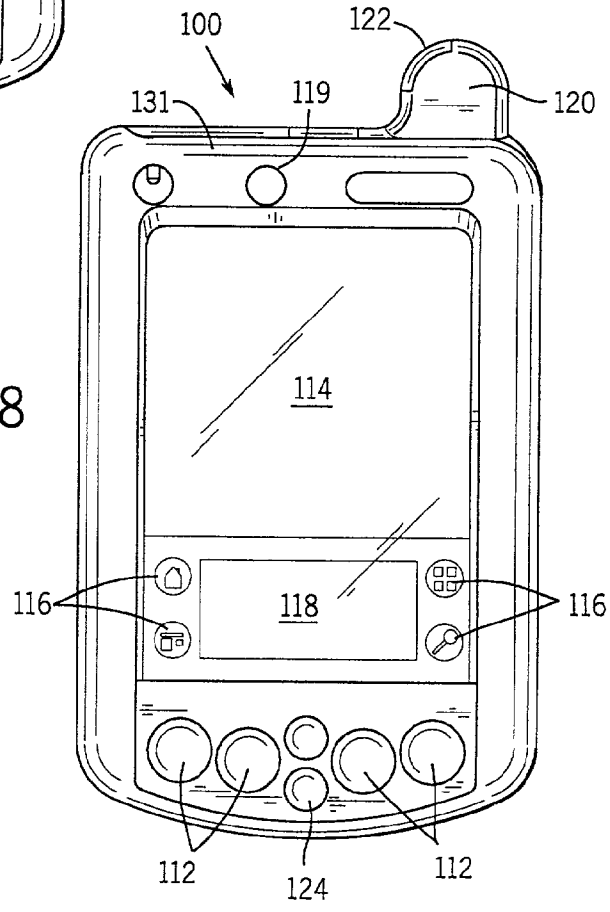
100
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FIG. 8

HANDHELD COMPUTER WITH POP-UP USER INTERFACE

BACKGROUND

[0001] Handheld computing devices, "palmtops,""palmhelds," personal digital assistants (PDAs), or handheld computers typically weigh less than a pound and fit in a pocket. These handhelds generally provide some combination of personal information management, database functions, word processing, and spreadsheets as well as voice memo recording, wireless e-mail, and wireless telephony functions. Because of the small size and portability of handhelds, strict adherence to hardware constraints such as memory and processor size must be maintained.

[0002] Conventional handheld computing devices can include a display and screen or touch screen. The display is provided behind the touch screen. A portion of the display can be dedicated for an entry area or user interface which allows a user to input text to the handheld computing device. For example, various conventional handheld computing devices manufactured by Palm, Inc. include a graffiti pad in a fixed location on its touch screen. The graffiti pad can include an area for providing letters (text) and an area for providing numbers (text) and can further include handwriting recognition software to interpret the user inputs. For example, the Palm® III device and Palm® V device include a graffiti pad fixed to a bottom quarter of the display. Letters and numbers can be input using a stylus or finger. The fixed graffiti area requires space on the display and touch pad. Further, the fixed graffiti area cannot be enlarged if necessary.

[0003] In addition, conventional handheld computing devices manufactured by Palm, Inc. include a keyboard interface duplicating a QWERTY-style keyboard that is selectively provided on the display. The keyboard interface is displayed in response to the selection of a keyboard option from a menu and/or an icon when an input is provided. Therefore, when inputting data a user can select the keyboard interface through which text can be entered. With the Palm, after the user selects a key marked done on the keyboard, the keyboard is no longer displayed.

[0004] Other conventional handheld computing devices such as handheld computing devices manufactured by Hewlett Packard have included a pop-up user interface icon. A floating icon on the screen is touched. One such device is the HP Omni-Go device. Therefore, by user request, a device through software can provide a box which floats on the screen. However, a user was often confused because the placement of the small floating icon is difficult to predict on the screen.

[0005] Thus, there is a need for a dynamic user interface which can be removed or enlarged on the display/touch screen of a handheld computing device. Further, there is a need for an elegant way for engaging or activating a user interface area such as a keyboard or a graffiti area. Further, there is a need for a graffiti area that can be moved and can have multiple sizes.

SUMMARY OF THE INVENTION

[0006] An exemplary embodiment relates to a handheld computer system. The handheld computer system includes a switch, a user interface, a housing, and a display. The display is supported by the housing. The user interface includes a text entry area. The text entry area is activated in response to the manipulation of the switch, the switch being a non-display element.

[0007] Another exemplary embodiment relates to a method of interfacing with the handheld computer system. The handheld computer system includes a display and a touch pad. The method includes manipulating a user interface device to cause a suitable area for receiving handwritten characters to be displayed on the display above or behind the touch pad and providing handwritten characters on the touch pad and the means for activating and deactivating is not located on the display.

[0008] Another exemplary embodiment relates to a user interface for a handheld computer system. The handheld computer system includes a display and a touch pad. The user interface includes means for receiving handwritten characters on the touch pad and means for activating and deactivating the means for receiving, wherein the means for receiving is reduced in size or removed from the display when deactivated wherein the user interface device is not located on the display.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention will become more fully understood from the following detailed description, taken in conjunction with the accompanying drawings, wherein like reference numerals refer to like elements, in which:

[0010] **FIG. 1** is a schematic general block diagram of a handheld computer including a display and a touch screen, the display and the touch screen providing a text entry area that can be activated and deactivated in accordance with an exemplary embodiment;

[0011] **FIG. 2** is a flow diagram representative of the operation of the handheld computer illustrated in **FIG. 1**;

[0012] **FIG. 3** is a schematic planar front elevation view of the handheld computer illustrated in **FIG. 1**, showing a display with a lateral pressure-sensitive switch for activating and deactivating the text entry area entry area activated;

[0013] **FIG. 4** is a schematic planar front elevation view of the handheld computer illustrated in **FIG. 3** showing an activated text entry area;

[0014] **FIG. 5** is a schematic planar front elevation view of the handheld computer illustrated in **FIG. 1** with an elongated switch for activating and deactivating the text entry area, in accordance with another exemplary embodiment;

[0015] **FIG. 6** is a schematic planar front elevation view of the handheld computer illustrated in **FIG. 1** with a switch for activating and deactivating the text entry area, the text entry area occupying a top portion of the display and touch screen in accordance with another exemplary embodiment, showing a user interface;

[0016] **FIG. 7** is a schematic planar front elevation view of the handheld computer illustrated in accordance with yet another exemplary embodiment, with a switch for activating the text entry area, the text entry area being of variable sizes, wherein the interface area is provided at a top of the screen;

[0017] **FIG. 8** is a schematic planar front elevation view of the handheld computer illustrated in **FIG. 1** with a circular switch for activating and deactivating the text entry area in accordance with yet another exemplary embodiment, wherein the interface area is provided in multiple sizes; and

[0018] **FIG. 9** is a planar front elevation view of a handheld computer illustrated in **FIG. 1** with a switch on lateral sides of the computer, the switch being for activation and deactivation of the text entry area, in accordance with still another exemplary embodiment.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0019] Referring to **FIG. 1, a** handheld computer **100** is depicted according to an exemplary embodiment. Handheld computer **100** may include Palm style computers manufactured by Palm, Inc., of Santa Clara, Calif. Other exemplary embodiments may include Windows CE handheld computers, or other handheld computers and personal digital assistants, as well as mobile telephones, web access phones, pagers, and other mobile computing or communication devices. Computer **100** can include a user interface **102**, a processor **104**, and a display **114**. User interface **103** provides data or commands to processor **104** which controls display **114**. Interface **102** can include a switch **119**, function keys **112**, as well as a text entry area **118** provided on display **114** (see **FIG. 3**).

[0020] Computer **100** can include a user interface **102**, a processor **104**, and a display **114**. User interface **102** provides data or commands to processor **104** which controls display **114**. Interface **102** can include a switch **119**, function keys **112** as well as a text entry area **118** provided on display **114** (see **FIG. 3**).

[0021] Preferably, handheld computer **100** includes interactive hardware and software that performs functions such as maintaining calendars, phone lists, task lists, note pads, calculator applications, spreadsheets, games, video files, and other applications capable of running on a computing device. Further, handheld computer **100** may be configured for such functions as voice memo recording and playback as well as communications network connectivity, Internet connectivity, wireless messaging, e-mail, always-on e-mail, and wireless telephony. In one embodiment, computer **100** includes at least the functionality of the PALM® M105, PALM® 111, PALM® V, PALM® M505, PALM® M500, or PALM® VII series handled computing devices.

[0022] Handheld computer **100**, depicted in **FIG. 3**, includes a plurality of input function keys **112** and display **114** having graphical user interface features. Display **114** can be a monochrome or color LED display or OLED display. Display **114** may be provided with a touch screen interface that allows a user to select and alter displayed content using a pointer, such as but not limited to a stylus, a pen tip, a fingertip, or other pointing devices.

[0023] Referring to **FIGS. 1 and 3**, in an exemplary embodiment, display **114** also includes a data entry area, such as, area **118** for tracing alpha-numeric characters as input. Area **118** can be a Graffiti™ text entry (or other handwriting recognition software) area optionally including a first portion for entering letters (text) and a second portion for entering numbers (text).

[0024] A plurality of input icons **116** for performing automated or preprogrammed functions may be provided on a portion of display **114** (see, e.g., **FIG. 4**). Display **114** can also include a text entry area, such as a keyboard provided on display **114** designating areas of the touch screen interface for particular letters. The keyboard can be accessible via switch **119** discussed below or through a menu or icon activated command.

[0025] In an exemplary embodiment, handheld computer **100** may include an integrated antenna **120 (FIG. 3)** configured to transmit and receive wireless communication signals, such as, but not limited to, cellular telephone communication signals and other radio frequency (RF) communications signals using an RF transceiver. Antenna **120** may further include an indicator light **122** integrated into antenna **120** for indicating the transmission and reception of wireless communication signals. Further, light **122** may be used to indicate other states of handheld computer **100**.

[0026] In an exemplary embodiment, handheld computer **100** also includes navigation buttons **124** that may be utilized for navigating or scrolling of information displayed on display **114**. Further, navigation buttons **124** may be programmed for other uses depending on the application running on handheld computer **100**. Handheld computer **100** may be used for any of a variety of wireless communications, including, but not limited to, communications with the World Wide Web, mobile telephone communications, e-mail communications, etc.

[0027] Advantageously, handheld computer **100** includes a switch **119** for activating and deactivating a text entry area such as entry area **118**. Switch **119** can be a variety of devices for indicating whether entry area **118** should be activated or deactivated. For example, switch **119** can be a pressure activated switch or sensor, a push button, a mechanical switch, a sliding switch, a space bar type switch, a capacitive sensor, or other manipulatable device.

[0028] Computer **100** can be designed to operate in a toggle mode in which switch **119** is pressed or engaged to cause entry area **118** to appear on display **114**. Display **114** continues to display entry area **118** until switch **119** is engaged again or another switch is manipulated.

[0029] The toggle mode is particularly advantageous for users who only have one hand free, are disabled, or otherwise cannot engage switch **119** while entering data into writing section **118**. Alternatively, entry area **118** can be made to disappear by touching a box, or other symbol in the writing area. In another embodiment, computer **100** operates in a non-toggle mode in which entry area **118** is continuously displayed as switch **119** is engaged. Once switch **119** is no longer engaged, entry area **118** is removed from display **114**. In the non-toggle mode, ergonomic efficiency is enhanced as area **118** pops-up in response to switch **119** being engaged when the user picks up computer **100** is in a writing position.

[0030] Preferably, computer **100** includes software for causing entry area **118** to be activated or deactivated in response to the manipulations of switch **119**. Preferably, switch **119** is a pressure activated sensor or switch located on a side housing of handheld computer **100**.

[0031] With reference to **FIGS. 1 and 2**, operation of system **100** is described below. At a step **200**, a user engages

a portion of user interface **102** such as switch **119** to begin entry of text in area **118**. When switch **118** of user interface **102** is engaged, entry area **118** is displayed on display **114** at step **204**. Entry area **118** can be displayed in a variety of sizes and a variety of locations. For example, display **118** can be provided as a keyboard, or a graffiti area at a bottom or top of display **114**. In another example, display **204** can cause an application area of display **114** to scroll up as entry area **118** is displayed on bottom of display **114**. Entry area **118** can appear in a pop-up effect or be scrolled from a top, side or bottom.

[**0032**] At a step **206**, text such as letters or numbers or symbols can be entered on area **118**. After the user enters text in step **206**, the user can release switch **119** or at a step **208** to cause entry area to be removed from display at a step **210**. Alternatively, the user can manipulate switch **119** again to cause entry area **118** to be removed or touch another portion of user interface **118**.

[**0033**] With reference to FIGS. **3-9**, various embodiments are shown including switch **119** of various shapes and sizes and entry area **118** of various sizes and placements on display **114**. Further, switch **119** can be placed at various locations on computer **100**. The embodiment shown in FIGS. **3-9** can be combined with each other without departing from the scope of the invention. Although shown as examples, the embodiments of FIGS. **3-9** are examples only and are not by any means the only examples of writing areas **118** and switches **119**.

[**0034**] With reference to **FIGS. 3 and 4**, handheld computer **100** is shown with switch **119** disengaged (**FIG. 3**) and with switch **119** engaged (**FIG. 4**). In **FIG. 3**, switch **119** is a pressure sensitive switch located on at least one lateral side **121** of computer **100**. The use of switch **119** allows the user to immediately engage entry area **119** without having to look for an icon on display **114**.

[**0035**] With reference to **FIG. 4**, when lateral side **121** is deformed due to pressure provided by user, entry area **118** is displayed upon a bottom portion of display **114**. In another embodiment, lateral side **121** is not deformed in response to pressure, however switch **118** senses pressure. One example of a pressure sensitive switch can be a substantive deformation of lateral side **121**. Computer **100** can be configured to sense the application of a squeezing motion by the user.

[**0036**] Handheld computer **100** in **FIGS. 3 and 4** is preferably operative in non-toggle mode in which area **118** is only displayed as switch **118** is engaged or senses pressure. In this way, when computer **100** is held and squeezed by a user in one hand, entry area **118** is provided which allows text to be entered by the other hand of the user. Such an elegant approach allows the user to engage and disengage the entry area **118** in response to natural motions associated with picking up handheld computer **100** and writing or pressing keys.

[**0037**] With reference to **FIG. 5**, handheld computer **100** includes switch **119** embodied as a spacebar switch or elongated switch on a side **123** handheld computer **100**. Alternatively, switch **119** can be provided on a bottom surface or a lateral surface of handheld computer **100**.

[**0038**] In this embodiment, computer **100** can operate in a toggled or non-toggled mode. In the toggled mode, when switch **119** is pressed such as by the thumb of the user as computer **100** is held, entry area **118** is displayed on screen **114**. When switch **119** is released or disengaged, entry area **118** disappears. In a toggled-mode, when switch **119** is pressed once, entry area **118** is displayed until switch **119** is pressed again. Computer **100** can be configured for use in the toggle or non-toggle mode.

[**0039**] With reference to **FIG. 6**, handheld computer **100** includes a switch **119** which is provided on a side **125** of computer **100**. Switch **118** in **FIG. 6** is not quite as elongated as in **FIG. 5**. In addition, handheld computer **100** is configured so that entry area **118** is provided on a top portion of display **114**, rather than on a bottom portion as shown in FIGS. **1-5**.

[**0040**] Alternatively, entry area **118** can be provided on a middle portion of display **114** or a side portion of display **114**. In one embodiment, the location of entry area **118** can be configured through a menu selection or by dragging area **118** to a desired location.

[**0041**] With reference to **FIG. 7**, handheld computer **100** utilizes any of buttons **112**, **120** or **124** to provide entry area **118**. In this embodiment, buttons **112** or **124** operate as switch **119**. Further, in **FIG. 7**, handheld computer **100** includes an enlarged entry area **118** which does not include icons such as icons **116** shown in FIGS. **1-6**. Preferably, entry area **118** includes icons such as boxes **127** provided on screen **114** to indicate the size of entry area **118**. For example, in **FIG. 7**, two sizes are selectable, such as a size associated with entry area **118** in **FIG. 6** and a size associated with entry area **118** in **FIG. 7**. A third box can be utilized to make entry area **118** disappear.

[**0042**] With reference to **FIG. 8**, handheld computer **100** includes a circular push button switch **119** located at a top portion **131** of computer **100**. With reference to **FIG. 9**, switch **119** extends from a lateral side **121** and **137**. In **FIG. 9**, switch **119** can be a slidable switch, or a deformable push switch or a pressure sensor. Computer **100** in **FIG. 9** can operate in a toggle or non-toggle mode.

[**0043**] While the detailed drawings, specific examples and particular formulations given describe preferred and exemplary embodiments, they serve the purpose of illustration only. The inventions disclosed are not limited to the specific forms shown. For example, the methods may be performed in any of a variety of sequence of steps. The hardware and software configurations shown an described may differ depending on the chosen performance characteristics and physical characteristics of the computing devices. For example, the type of computing device, communication bus, or processor used may differ. The systems methods depicted and described are not limited to the precise details and conditions disclosed. Furthermore, other substitutions, modifications, changes, and omissions may be made in the design, operating conditions, and arrangement of the exemplary embodiments without departing from the scope of the invention as expressed in the appended claims.

What is claimed is:

1. A handheld computer system, comprising:

a switch;

a user interface;

a housing; and

a display supported by the housing, wherein the user interface includes an information entry area, wherein the information entry area is activated in response to manipulation of the switch the switch being a non-display element.

2. The handheld computer system of claim 1, wherein the information entry area is deactivated in response to manipulation of the switch.

3. The handheld computer system of claim 2 wherein the switch includes two actions: a first manipulation of the switch to activate the information entry area and a second manipulation of the switch to deactivate the information entry area.

4. The handheld computer system of claims **1**, **2**, or **3** wherein the switch is part of a touch pad associated with the display, a squeeze switch associated with the housing, or a button associated with the housing.

5. The handheld computer system of claims **1**, **2**, or **3** wherein the switch is a squeeze switch.

6. The handheld computer system of claims **1**, **2**, or **3** wherein the information entry area is a pop-up menu.

7. The handheld computer system of claims **1**, **2**, or **3** wherein the information entry area has at least two sizes when activated.

8. A user interface for a handheld computer system, the handheld computer system comprising a display and a touch pad, the user interface comprising:

means for receiving information at the touch pad and the display; and

means for activating and deactivating the means for receiving, wherein the means for receiving is reduced in size or removed from the display when deactivated and the means for activating and deactivating is not located on the display.

9. The user interface means of claim 8 wherein the means for receiving is at least one of a graffiti area, a pictorial representation of a keyboard, an area to accept a drawing, and an area assigned for entering information into the handheld computer system.

10. The user interface means of claim 8 wherein the handwritten characters include numbers or letters.

11. The user interface means of claim 9 wherein the handwritten characters include numbers or letters.

12. The user interface of claim 8 wherein the means for receiving is removed from the display when activated.

13. The user interface of claims **9**, **10**, **11**, or **12** wherein the means for activating and deactivating includes a squeeze switch.

14. The user interface of claims **9**, **10**, **11**, or **12** wherein the means for activating and deactivating is integrated into a portion of a housing of the handheld computer.

15. The user interface of claims **13** wherein the means for activating and deactivating is integrated into a portion of a housing of the handheld computer.

16. The user interface of claim 14 wherein the means for activating and deactivating includes a symbol.

17. The user interface of claim 14 wherein the means for activating and deactivating includes a symbol is a fixed symbol.

18. A method of interfacing with a handheld computer system, the handheld computer system comprising a display and a touch pad, the method comprising:

manipulating a user interface device to cause a suitable area for receiving handwritten characters to be displayed on the display above or behind the touch pad; and

providing information entry on the touch pad,

wherein the user interface device is not located on the display.

19. The method of claim 18 further comprising:

manipulating the user interface device to cause the suitable area to be removed from the display.

20. The method of claim 18 wherein the user interface device is a mechanical switch.

21. The method of claim 20 wherein the mechanical switch is a squeeze switch integrated in a housing of the handheld computer system.

22. The method of claims **19**, **20**, or **21** wherein the suitable area is at least one of a pop-up graffiti area, a pictorial representation of a keyboard, an area to accept a drawing, and an area assigned for entering information into the handheld computer system.

* * * * *