

DISPLAY SURFACE CONTAINS A CUT OUT REGION REFORMATTING DISPLAY DATA

This non-provisional patent application claims priority based upon the prior patent applications entitled "UX bible", application number GB1222054.7, filed December 7, 2012, "Device with displays", application number GB1223011.6, filed December 20, 2012, "Device with displays", application number GB1303275.0, filed February 25, 2013, "Device with displays", application number US 61/787,333 filed March 15, 2013, "Reversed mode", application number GB1222457.2, filed December 13, 2012, and "Reversed mode 2", application number GB1222987.8, filed December 20, 2012, herein all such applications in their entirety incorporated by reference.

Field

This invention relates to mobile devices which display surface contains a cut out region reformatting display data.

Background

The pervasiveness of computing devices is ever increasing. For example, users can interact with a traditional desktop computer, a tablet computer, a mobile phone, and so on to access a variety of functionality for work and personal uses. Additionally, the variety of functionality that is available to users of these mobile devices also continues to increase, including complexity of application workflows and multimedia capabilities.

Current users need to leverage their devices to provide for both uninterrupted interaction of the user with device expressed functionality (e.g. executing applications). It is also desirable for power management concerns to selectively use the screen or screens of a mobile device while still providing for efficient and convenient use of the device and application functionality desired by the user.

Typically a mobile device has a display surface arranged in the area of the mobile device face free from a camera, a flash and other electronic components of the mobile device. This limits the area of the display surface and the amount of information to be displayed on it.

Summary

It is an object of the present invention is to provide display data for a device and method with one or more screens to obviate or mitigate at least one of the above-presented disadvantages.

Typically a mobile device has a display surface arranged in the area of the mobile device face free from a camera, a flash and other electronic components of the mobile device. This limits the area of the display surface and the amount of information to be displayed on it. Contrary to current devices and methods there is provided a mobile assembly having: a case having a first face and a second face opposite to the first face; a display screen positioned on the first face, the display screen configured for receiving display instructions used to position display data on a display surface of the display screen; a computer processor mounted in an interior of the case; a memory mounted in the interior of the case for storing instructions for execution by the computer processor to implement one or more operations of a display module providing the display instructions; an electronic component positioned on the first face within a peripheral boundary of the display surface; and a physical cut out region in the display surface, the physical cut out region located on the first face about the electronic component. It is also recognized that the physical cutout can be embodied as a virtual cutout in the display data that can be repositioned in location about the display surface. For example, TV channels typically put their brand image in one of the areas (e.g. corners) of the screen, which can be considered as a cut-out, since this brand image stays always on top of the display data of the display screen and can therefore occlude some information of the display data behind the brand image.

According to a first aspect provided is a mobile assembly having: a case having a first face and a second face opposite to the first face; a display screen positioned on the first face, the display screen configured for receiving display instructions used to position display data on a display surface of the display screen; a computer processor mounted in an interior of the case; a memory mounted in the interior of the case for storing instructions for execution by the computer processor to implement one or more operations of a display module providing the display instructions; an electronic component positioned on the first face within a peripheral boundary of the display surface; and a physical cut out region in the display surface, the physical cut out region located on the first face about the electronic component.

According to a further aspect provided is a method for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to: receive the display data in the first display format for displaying on a display surface; access location data of a physical cut out region defining a cut out periphery of a physical cut out region in the display surface; use the location data to reformat the display data in to the second display format by repositioning a portion of the display data of the first display format determined as located within the cut out periphery to a position on the display surface located outside of the cut out periphery; and send display instructions for the display data in the second display format for display on the display surface of a display screen; wherein the display data is restricted from being located in the physical cut out region by the display module.

According to a further aspect provided is a method for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to: receive the display data in a first display format for displaying on a display surface; access location data of a physical cut out region defining a cut out periphery of a physical cut out region in the display surface; use the location data to reformat the display data in to the second display format by deleting a portion of the display data of the first display format determined as located within the cut out periphery; and send the display instructions for the display data in the second display format for display on the display surface of a display screen.

According to a further aspect provided is a mobile device case having: a cover case having a first face and a second face opposite to the first face; a display screen positioned on the first face, the display screen configured for receiving display instructions used to position display data on a display surface of the display screen; an electronic component positioned on the first face within a peripheral boundary of the display surface; and a physical cut out region in the display surface, the physical cut out region located on the first face about the electronic component.

According to a further aspect provided is a mobile assembly having: a case having a face; a display screen positioned on the face, the display screen configured for receiving display instructions used to position display data on a display surface of the display screen; a computer processor mounted in an interior of the case; a memory mounted in the interior of the case for storing instructions for execution by the computer

processor to implement one or more operations of a display module providing the display instructions; an electronic component positioned on the face within a peripheral boundary of the display surface; and a virtual cut out region in the display surface, the virtual cut out region for location on the face about a selected position within the peripheral boundary by a display module.

According to a further aspect provided is a method for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to: receive the display data in the first display format for displaying on a display surface; select location data of a virtual cut out region defining a virtual cut out periphery of a virtual cut out region in the display surface; use the location data to reformat the display data in to the second display format by repositioning a portion of the display data of the first display format determined as located within the virtual cut out periphery to a position on the display surface located outside of the virtual cut out periphery; and send display instructions for the display data in the second display format for display on the display surface of a display screen; wherein the display data is restricted from being located in the virtual cut out region by the display module.

According to a further aspect provided is a method for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to: receive the display data in a first display format for displaying on a display surface; select location data of a virtual cut out region defining a virtual cut out periphery of a virtual cut out region in the display surface; use the location data to reformat the display data in to the second display format by deleting a portion of the display data of the first display format determined as located within the virtual cut out periphery; and send the display instructions for the display data in the second display format for display on the display surface of a display screen.

Brief description of the drawings

The detailed description is described with reference to the accompanying figures. The use of the same reference numbers in different instances in the description and the figures can indicate similar or identical items.

Figure 1 is a view of the mobile device.

Figure 2 is an alternative embodiment of the mobile device shown in Figure 1.

Figure 3 is a different view of the mobile device shown in Figure 2.

Figure 4 is an alternative embodiment of the mobile device shown in Figure 1.

Figure 5 is an alternative embodiment of the mobile device shown in Figure 1.

Figure 6 is a left side view of the mobile device shown in Figure 5.

Figure 7 is a view of the face of the mobile device in accordance with an alternative embodiment of the mobile device shown in Figure 1.

Figures 8-10 are views of the display surfaces of the display screen of the mobile device in accordance with alternative of the mobile device shown in Figure 1.

Figure 11 is an alternative embodiment of the mobile device shown in Figure 1.

Figure 12 is an alternative embodiment of the mobile device shown in Figure 1.

Figure 13 is a schematic view of a computer processing system of the mobile device shown in Figure 1.

Figures 14-17 are alternative embodiments of the computer processing system of the mobile device shown in Figure 13.

Figure 18 a structure of the case of the mobile device shown in Figures 5 and 6.

Figure 19 is a flow chart of display method for the device of Figure 1.

Detailed description

The claimed invention can be implemented in numerous ways, including as a computer process; a computer apparatus; a computer system; a mobile assembly having one or more than one display screen, as a mobile device having multiple on-board display screens or as a display screen enabled mobile device coupled to a mobile device cover also having a display screen, a computer program product embodied on a computer readable storage medium as a physical memory, a processor, such that one or more computer processors are configured to execute instructions stored on and/or provided by the physical memory coupled to the processor(s), and/or software embodied as asset of instructions when executed by processor(s) provide for the listed functionality expressed by the set of instructions in interaction(s) between the user and the device(s), operations/communication between or as a result of one or more processes (e.g. hardware processes, software processes) on the computer device(s), and for

communication of data/information (e.g. display content) between the computing device and a cover device, remote network device, and/or processor(s), such as processor(s) configured to execute instructions stored on and/or provided by the physical memory coupled to the processor(s). As such, computer components and related functionality of the present invention are considered essential in order to provide for application coordination as further discussed below. As such, the coordinated display of contextual display data based on an application state can be implemented on one or more displays as desired. It is recognised for multi-display embodiments of the mobile assembly, the ability for the application to continue interaction with a user via one display screen while at the same providing for contextual display data display on another display screen can be advantageous since one display indicates a particular state of the application while the other display can be used by the user to step through an application workflow associated with that state (e.g. multiple actions of the application while in the same state). As noted, the single or multiple display(s) can be on the mobile device, a cover of the mobile device, or both the cover and the mobile device of the mobile assembly, as desired.

The processor(s) can be embodied as on-board computer components a mobile device and/or distributed as multiple processors on-board both a mobile device and a coupled mobile device cover. In this specification, these implementations, or any other form that the invention can take, can be referred to as techniques. In general, the order of the steps of disclosed processes can be altered within the scope of the claimed invention. Unless stated otherwise, a component such as a processor or a memory described as being configured to perform a task can be implemented as a general component that is temporarily configured to perform the task at a given time or a specific component that is manufactured to perform the task. As used herein, the term `processor` refers to one or more devices, circuits, and/or processing cores configured to process data, such as computer program instructions. The processor can use or comprise the capabilities of a controller or microprocessor, for example. Accordingly, any of the functionality of the modules can be implemented in hardware, software or a combination of both. Accordingly, the use of a processor as a computer component and/or as a set of machine-readable instructions is referred to generically as a processor/module for sake of simplicity.

A detailed description of one or more embodiments of the claimed invention is provided below along with accompanying figures that illustrate the principles of the invention. The

claimed invention is described in connection with such embodiments, but the claimed invention is not limited to any embodiment. The scope of the claimed invention is limited only by the claims and the claimed invention encompasses numerous alternatives, modifications and equivalents. Numerous specific details are set forth in the following description in order to provide a thorough understanding of the claimed invention. These details are provided for the purpose of example and the invention can be practiced according to the claims without some or all of these specific details. For the purpose of clarity, technical material that is known in the technical fields related to the claimed invention has not been described in detail so that the claimed invention is not unnecessarily obscured.

The disclosure of any feature(s) within a paragraph and/or feature(s) in different paragraphs can be combined as evident to a person skilled in the art.

A mobile device 1 as shown in Figure 1 has a case 2 having a first face 3 and a second face 4 opposite to the first face 3. A display screen 5 is positioned on the first face 3. The electronic component 6 is positioned on the first face 3 within a peripheral boundary 7 of the display surface 8 of the display screen 5. A physical cut out region 9 is located in the display surface 8 on the first face 3 about the electronic component 6. The electronic component 6 can be one of the following: an imager lens, a camera lens, a light source, such as a flash device, a speaker, a microphone, a touch panel, a switch, a connector socket for receiving a connector plug of a peripheral device such as a headphone jack, a memory card connector, a sim-card connector, a hardware button etc.

A mobile device 11 shown in Figure 2 and Figure 3 has a case 12 having a first face 13, a second face 14 positioned opposite to the first face 13 and four third faces 15 positioned between the first face 13 and the second face 14. Four third faces 15 are four sides 15 of the case 12. The first face 13 and the second face 14 are in contact with one another along four sides 15 of the case 12. A display screen 16 is positioned on the first face 13 as a first display screen 16 and a second display screen 17 is positioned on the second face 14. A physical cut out region 18 is arranged in the display surface 19 of the first display screen 16. An imager lens 20 and a flash device 21 are positioned on the first face 13 within the peripheral boundary 22 of the display surface 19. The physical cut out region 18 is located about the imager lens 20 and the flash device 21.

The peripheral boundary 22 has a form of a rectangular frame formed as a part of the case 12 of the mobile device 11. The physical cut out region 18 has the shape based on a rectangle with bottom rounded side.

The first face 13 is a curved face and the display surface 19 follows a curvature of the curved surface of the first face 13. A degree of curvature of the curved surface of the first face 13 is greater in a first surface region 23 as compared to the degree of curvature of a second surface region 24. The first surface region 23 is adjacent to the contact of the first face 13 with the second face 14 along the sides 15 of the case 12. The second surface region 24 is spaced apart from the said contact and is in a middle of the display surface 19.

The mobile device 11 can be a multi-screened device.

The mobile device 11 can have one or more third faces 15.

The first face 13 and the second face 14 can be in contact with one another along at least one side 15 of the case 12.

A mobile device 100 shown in Figure 4 has a case 101 having a first face 102 and a second face 103 positioned opposite to the first face 102. The first face 102 and the second face 103 are in contact with one another along four sides 104 of the case 101. The first face 102 is a first case panel 102 and the second face 103 is a second case panel 103. The first case panel 102 and the second case panel 103 connect with one another to form the interior of the case 101 of the mobile device 100.

A display screen 105 is positioned on the first case panel 102. The display screen 105 has a display surface 106 occupying ninety percent of a total panel surface area of the first case panel 102. A physical cut out region 110 is arranged in the display surface 106 of the display screen 105 for positioning of an electronic component 111.

A second display screen 107 is positioned on the second case panel 103.

The first case panel 102 is a curved face and the display surface 106 follows a curvature of the curved surface of the first case panel 102. A degree of curvature of the curved surface is greater in a first surface region 108 as compared to the degree of curvature of a second surface region 109. The first surface region 108 is adjacent to the

contact of the first case panel 102 with the second case panel 103. The second surface region 109 is spaced apart from said contact and is in a middle of the display surface 106.

The mobile device 100 can be a multi-screened device.

The first face 102 and the second face 103 can be in contact with one another along at least one side 104 of the case 101.

The mobile device 200 shown in Figures 5 and 6 has a case 201 having a first face 202 and a second face 203. The first face 202 comprises a display screen 204 and a support structure 205 having the display screen 204 mounted thereon. An electronic component 206 is positioned on the first face 202 within a peripheral boundary 207 of the display surface 208 of the display screen 204. The display surface 208 has a cut out region 209 located about the electronic component 206. The support structure 205 has a component location 210 for mounting the electronic component 206. The first face 202 is a curved face and the display surface 208 follows a curvature of the curved surface of the first face 202.

The component location 210 is an aperture in the support structure 205.

Figure 7 shows the alternative embodiment of the first face 300 of the mobile device 1 shown in Figure 1. The mobile device has a physical cut out region 301 in the corner of the display surface 302 of the display screen 303. The cut out region 301 has a rectangular shape. The cut out region 301 is positioned at a corner of the display surface 302 and the portion of the peripheral edge 306 of the cut out region 301 overlaps (e.g. coincident) with a portion of the peripheral boundary 305 of the display surface 302. The cut out region 301 is made for arrangement of an imager lens 304. The imager lens 304 is positioned on the first face 300 within a peripheral boundary 305 of the display surface 302. The display screen 303 is a bi-stable screen in the form of EPD screen.

Figure 8 and Figure 9 show the alternative embodiments of display screens 400 and 500 of the mobile phone 1 shown in Figure 1.

As shown in Figure 8 the display screen 400 has a display surface 401 with a physical cut out region 402. The physical cut out region 402 has a rectangular shape with one

rounded corner. The cut out region 402 is positioned at a corner of the display surface 401 and the portion of the peripheral edge 405 of the cut out region 402 overlaps (e.g. coincident) with a portion of the peripheral boundary 404 of the display surface 401. An imager lens 403 is positioned in the cut out region 402 within a peripheral boundary 404 of the display surface 401.

As shown in Figure 9 the display screen 500 has a display surface 501 with a physical cut out region 502. The physical cut out region 502 has a rectangular shape with one rounded corner. The cut out region 502 is positioned at a corner of the display surface 501 and the portion of the peripheral edge 506 of the cut out region 502 overlaps (e.g. coincident) with a portion of the peripheral boundary 504 of the display surface 501. The imager lens 503 and the flash device 505 are positioned in the cut out region 502 within a peripheral boundary 504 of the display surface 501.

Figure 10 shows the alternative embodiments of the physical cut out regions 601 and 602 of the display surface 603 of the display screen 600. The cut out region can be made in a rectangular form (position 601) or in a triangular form (position 602) and be adjacent to a peripheral boundary 604 of the display surface 603.

The mobile device 700 shown in Figure 11 has a case 701 having a first face 702 and the second face 703. The first face 702 is curved. The second face 703 is flat. The first face 702 and the second face 703 connect with one another to form the interior of the case 701 of the mobile device 400. The first face 702 and the second face 703 connect with one another along the third surfaces 704. The third surfaces 704 are curved. The curvature of the third surfaces 704 is greater than the curvature of the first surface 702. The case 701 of the mobile device 700 has the shape of flattened sphere. A display screen 705 is positioned on the first face 702 as a first display screen 705 and a second display screen 706 is positioned on the second face 703.

A physical cut out region 708 is arranged in the display surface 707 of the first display screen 705. An electronic component 709 is positioned on the first face 702 within the peripheral boundary 710 of the display surface 707. The physical cut out region 709 is located about the electronic component 709. The first face 702 includes a touch screen layer 711 mounted on top of the display screen 705. The second face 703 includes a second touch screen layer 712 mounted on top of the second display screen 706. No hardware buttons are provided on the case 701 of the mobile device 700.

The mobile device 700 can be a multi-screened device.

Alternatively the first face 702 and the second face 703 have the same curvature in order to provide the case 701 of the mobile device 700 in the form of sphere.

The mobile device 800 shown in Figure 12 is placed into a mobile device case 801. The mobile device case 801 has a cover case having a first face 802 and a second face opposite to the first face 802. A display screen 803 is positioned on the first face 802. The display screen 803 is configured for receiving display instructions used to position display data on a display surface 804 of the display screen 803. The display screen 803 is an EPD screen. The display surface 804 has a physical cut out region 805.

An electronic component can be positioned on the first face within a peripheral boundary 806 of the display surface 804. The physical cut out region 805 can be then located about the electronic component.

The mobile device case 801 shown in Figure 12 can alternatively include a supplementary processor, a supplementary memory and a supplementary display module mounted in the interior of the mobile device case 801. The supplementary memory stores the instructions to be executed by the supplementary computer processor. The supplementary processor is arranged to execute instructions to implement one or more operations of the supplementary display module. Based on the display instructions received from the computer processor the supplementary display module implements the corresponding operations to display data on the display surface 804 of the display screen 803.

Alternatively, displaying data on the display surface 804 of the display screen 803 of the mobile device case 801 is implemented by the display module of the mobile device.

The cut out region is cut from the display surface before assembling of the mobile device.

The display surface can be covered with glass after the cut out region is cut from display surface.

The cut out region can be of different shape accommodated for the curved form of the corresponding face with the display surface depending on the curvature of the face.

In the embodiments described above the physical cutout region can be replaced by the virtual cutout region, arranged in the area of the display surface covering the electronic components located under the display surface. The virtual cutout region is movable in response to instructions received from the display module.

In all embodiments described above the display screen can be one of the following display screen types: different types of LCD screens, different types of AMOLED (active-matrix organic light emitting diode) screens, Retina display screens, bi-stable screens such as EPD (electronic paper displays, E-ink).

The second display screen can be one of the following display screen types: different types of LCD screens, different types of AMOLED (active-matrix organic light emitting diode) screens, Retina display screens, bi-stable screens such as EPD (electronic paper displays, E-ink).

The EPD screen can be made either white and black or grayscale or in colour.

The display screen may occupy more than 50%, more than 70%, more than 90% or 100% of the first face.

The second display screen may occupy more than 50%, more than 70%, more than 90% or 100% of the second face.

Figure 13 shows computer processing system of the mobile device shown in Figure 1.

As shown in Figure 13 the mobile device 2000 has the computer processor 2002, the memory 2003 and the display module 2004 mounted in the interior of the case 2001 of the mobile device 2000. The display screen 2005 is configured for receiving display instructions from the display module 2001 used to position display data on a display surface 2006 of the display screen 2005.

The computer processor 2002 is arranged to execute instructions to implement one or more operations of a display module 2004. The memory 2003 stores the instructions to be executed by the computer processor 2002. After the computer processor 2002 receives the display data for a displaying on a display surface 2006 it addresses to the memory 2003 to get the instructions to be executed by the computer processor 2002. The computer processor 2002 is configured to retrieve the instructions to be executed

from the memory 2003. After the computer processor 2002 finishes executing instructions received from the memory 2003 the computer processor 2002 provides the display instructions to the display module 2004 to implement one or more operations of the display module 2004. Based on the display instructions received from the computer processor 2002 the display module 2004 implements the corresponding operations to display data on the display surface 2006 of the display screen 2005. The data to be displayed on the display surface 2006 can be text data and/or picture data.

Alternatively, the mobile device can include more than one processor 2002. Each of one or more processors 2002 is arranged to retrieve instructions from the memory 2003 and to execute instructions to implement one or more operations of a display module 2004.

Figures 14-17 show alternative embodiments of computer processing systems of the mobile device shown in Figure 13.

As shown in Figure 14 the mobile device 2010 has the computer processor 2012, the memory 2013 and the display module 2014 mounted in the interior of the case 2011 of the mobile device 2010. The display screen 2015 is configured for receiving display instructions from the display module 2014 used to position display data on a display surface 2016 of the display screen 2015. The mobile device further contains the hardware button 2017. The hardware button 2017 is operatively coupled to the computer processor 2012 mounted in the interior of the case 2011.

As shown in Figure 15 the mobile device 2100 has the computer processor 2102, the memory 2103 and the display module 2104 mounted in the interior of the case 2101 of the mobile device 2100. The display screen (not shown) is configured for receiving display instructions from the display module 2104 used to position display data on a display surface 2106 of the display screen. The mobile device 2100 further contains an imager lens 2107 located on the first face and an imager device 2108 mounted in the interior of the case 2101. The imager lens 2107 operatively coupled to the imager device 2108.

As shown in Figure 16 the mobile device 2200 has the computer processor 2202, the memory 2203 and the display module 2204 mounted in the interior of the case 2201 of the mobile device 2200. The display screen (not shown) is configured for receiving display instructions from the display module 2204 used to position display data on a display surface 2206 of the display screen. The mobile device 2200 further contains a

light source 2207 located on the first face and a power source 2208 mounted in the interior of the case 2201. The light source 2207 is powered via the power source 2208.

As shown in Figure 17 the mobile device 2300 has the computer processor 2302, the memory 2303 and the display module 2304 mounted in the interior of the case 2301 of the mobile device 2300. The display screen (not shown) is configured for receiving display instructions from the display module 2304 used to position display data on a display surface 2306 of the display screen. The mobile device 2200 further contains a light source located on the first face and a power source 2308 mounted in the interior of the case 2301. The light source 2307 is powered via the power source 2308. The light source is a flash device 2307. The flash device 2307 is operatively coupled to an imager device 2309 mounted in the interior of the case 2301.

Figure 18 shows the layer structure of the case 201 of the mobile device 200 shown in Figures 5 and 6. The mobile device 200 has a case 201 having a first face 202 and a second face 203. The first face 202 comprises a display screen 204 and a support structure 205 having the display screen 204 mounted thereon. The support structure 205 has an aperture 210 as a component location for mounting the electronic component 206. An electronic component 206 is positioned on the first face 202 within a peripheral boundary 207 of the display surface 208 of the display screen 204. The display surface 208 has a cut out region 209 located about the electronic component 206. The mobile device 200 further comprises a touch screen layer 211 mounted on top of the display screen 204. A portion 212 of the touch screen layer 211 is positioned over the physical cut out region 209.

Referring to Figure 6, the mobile assembly 200, in this case a multi-display screen device by example only, has a case 201 for supporting the display screen 204 as a mobile device. It is recognised that the mobile assembly 200 can also be embodied as a multi screen mobile device (e.g. smart phone – see Figure 2), a mobile device cover 801 (e.g. case 99) having a display screen (see Figure 12), and/or a mobile device having a display screen and coupled to the device cover 801 also having a display screen (see Figure 12). For illustration purposes only, the following description on display functionally with respect to a display screen is done with reference to the mobile assembly 200 of Figure 6. Also considered is that the display screen can be any type of screen display, e.g. non-bi-stable such as but not limited to LCD, bi-stable such as but not limited to EPD, etc. It is recognised that the display surface 208 of the display 204

can be curved, as desired. The mobile assembly can also be a single screen mobile device, a single screen mobile device cover, a dual screen mobile device, a mobile device having a display screen coupled to a device cover having a further display screen, etc.

As such, the mobile assembly 200 has the case 201 having face 202 and a display screen 204 positioned on face 202. The display screen 204 is configured for receiving display instructions used to position display data on the display surface 208 of the display screen 204. The mobile assembly also has a computer processor 2002 (see Figure 13) mounted in an interior of the case 201. A memory 2003 is mounted in the interior of the case 201 for storing instructions for execution by the computer processor 2002 to implement one or more operations of a display module 2004 providing the display instructions to the display screen 204. An electronic component 206 (e.g. camera lens, flash or other light source, etc.) is positioned on the face 202 within a peripheral boundary 207 of the display surface 208. As such, the display data is displayed on the display surface 208 contained within the peripheral boundary 207 as the external display dimensions of the display screen 204. Further, the cut out region (e.g. physical) 209 in the display surface 208 is located on the face 202 about the mounted position of the electronic component 206. It is also recognised that the cut out region 209 could be a virtual cut out region 209 as generated by the display module 2004, as further described below. In the case of a virtual cut out region 209, the position on the display surface 208 of the virtual cut out region 209 can be varied, based on decision implemented by the display module 2004.

Referring again to Figure 13, the instructions when executed by the computer processor 2002 implement the one or more operations of the display module 2004 to: receive the display data in a first display format (e.g. containing display data defined within the cut out region 209); access location data of the physical cut out region 209 defining a cut out periphery (e.g. physical dimensions of the cut out region 209 defining where there will be an absence of display data displayed on the display surface 208) of the physical cut out region 209; use the location data to reformat the display data in to a second display format (e.g. omitting display data in the cut out region 209) by repositioning a portion of the display data of the first display format determined as located within the cut out periphery to a position on the display surface 208 located outside of the cut out periphery (e.g. dimensions of the cut out region 209); and provide the display instructions for the display data in the second display format to the display

screen 204 by the display module 2004; wherein the display data is restricted from being located in the physical cut out region 209 by the display module 2004. It is recognised that the portion of the display data can include text data, picture data, etc.

Alternatively, the instructions when executed by the computer processor 2002 implement the one or more operations of the display module 2004 to: receive the display data in a first display format; access location data of the physical cut out region 209 defining a cut out periphery of the physical cut out region 209; use the location data to reformat the display data in to a second display format by deleting a portion of the display data of the first display format determined as located within the cut out periphery; and provide the display instructions for the display data in the second display format to the display screen 204.

Alternatively, the instructions when executed by the computer processor 2002 implement the one or more operations of the display module 2004 to: use the location data to reformat the display data in to the second display format by repositioning the portion of the display data to a position on the display surface 208 located inside of the cut out periphery; and provide the display instructions for the display data in the second display format to the display screen; wherein a shape of the cut out periphery is provided as part of a design element in the display (e.g. picture) data. For example, the design element can be a defined geometrical shape positioned within a plurality of displayed data (e.g. text, picture, etc.). The defined geometrical shape can be a circle, a square, a triangle or any other shape as desired. Further, the design element can be a defined geometrical shape positioned within a plurality of geometrical shapes comprising the display (e.g. picture) data. Another example is where the computer processor (e.g. executing the functionality of the display module 2004) can match the shape of the cut out periphery to a shape of the portion of the display data.

Alternatively, referring again to Figure 13, the instructions when executed by the computer processor 2002 implement the one or more operations of the display module 2004 to: receive the display data in a first display format (e.g. containing display data defined within the virtual cut out region 209); define position/location data of the virtual cut out region 209 defining a cut out periphery (e.g. virtual dimensions of the cut out region 209 defining where there will be an absence of display data displayed on the display surface 208) of the virtual cut out region 209; use the location data to reformat the display data in to a second display format (e.g. omitting display data in the cut out region 209) by repositioning a portion of the display data of the first display format

determined as located within the virtual cut out periphery to a position on the display surface 208 located outside of the cut out periphery (e.g. dimensions of the cut out region 209); and provide the display instructions for the display data in the second display format to the display screen 204 by the display module 2004; wherein the display data is restricted from being located in the virtual cut out region 209 by the display module 2004. It is recognised that the portion of the display data can include text data, picture data, etc.

Alternatively, the instructions when executed by the computer processor 2002 implement the one or more operations of the display module 2004 to: receive the display data in a first display format; define position/location data of the virtual cut out region 209 defining a virtual cut out periphery of the virtual cut out region 209; use the location data to reformat the display data in to a second display format by deleting a portion of the display data of the first display format determined as located within the virtual cut out periphery; and provide the display instructions for the display data in the second display format to the display screen 204.

Alternatively, the instructions when executed by the computer processor 2002 implement the one or more operations of the display module 2004 to: use the virtual location data to reformat the display data in to the second display format by repositioning the portion of the display data to a position on the display surface 208 located inside of the virtual cut out periphery; and provide the display instructions for the display data in the second display format to the display screen; wherein a shape of the virtual cut out periphery is provided as part of a design element in the display (e.g. picture) data. For example, the design element can be a defined geometrical shape positioned within a plurality of displayed data (e.g. text, picture, etc.). The defined geometrical shape can be a circle, a square, a triangle or any other shape as desired. Further, the design element can be a defined geometrical shape positioned within a plurality of geometrical shapes comprising the display (e.g. picture) data. Another example is where the computer processor (e.g. executing the functionality of the display module 2004) can match the shape of the cut out periphery to a shape of the portion of the display data.

It is also recognised that a portion of the peripheral edge of the cut out region 209 can overlap (e.g. be coincident) with a portion of the peripheral boundary 209 of the display surface 208. The location of the cut out region 209 can be positioned at a corner of the

display surface 208. The location of the cut out region 209 can be positioned along a side of the display surface 208 (e.g. between two corners of the display surface 208).

Referring to Figure 19, a display method 1000 is provided for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to: step 1002 receive the display data in the first display format for displaying on a display surface 208; step 1004 select/identify location data of a virtual/physical cut out region 209 defining a virtual/physical cut out periphery of the virtual/physical cut out region 209 in the display surface 208; step 1006 use the location data to reformat the display data in to the second display format by repositioning a portion of the display data of the first display format determined as located within the cut out periphery to a position on the display surface 208 located outside of the cut out periphery; and step 1008 send display instructions for the display data in the second display format for display on the display surface 208 of a display screen 204; wherein the display data is restricted from being located in the cut out region by the display module 2004.

Claims

1. A mobile assembly having:

- a case having a first face and a second face opposite to the first face;
- a display screen positioned on the first face, the display screen configured for receiving display instructions used to position display data on a display surface of the display screen;
- an electronic component positioned on the first face within a peripheral boundary of the display surface;
- a physical cut out region in the display surface, the physical cut out region located on the first face about the electronic component;
- a computer processor mounted in an interior of the case; and
- a memory mounted in the interior of the case for storing instructions for execution by the computer processor to implement one or more operations of a display module to:
 - receive the display data in a first display format;
 - access location data of the physical cut out region defining a cut out periphery of the physical cut out region;
 - use the location data to reformat the display data in to a second display format; and
 - provide the display instructions for the display data in the second display format to the display screen.

2. The mobile assembly of claim 1, wherein the physical cut out region is located on the first face around a connector socket as the electronic component, the connector socket for receiving a connector plug of a peripheral device of the mobile assembly.

3. The mobile assembly of claim 2, wherein the connector socket is a headphone jack.

4. The mobile assembly of claim 1, wherein the physical cut out region is located on the first face around an imager lens as the electronic component, the imager lens operatively coupled to an imager device mounted in the interior of the case.

5. The mobile assembly of claim 1, wherein the physical cut out region is located on the first face around a light source as the electronic component, the light source powered via a power source mounted in the interior of the case.

6. The mobile assembly of claim 5, wherein the light source is a flash device operatively coupled to an imager device mounted in the interior of the case.
7. The mobile assembly of claim 1, wherein the physical cut out region is located on the first face around a hardware button as the electronic component, the hardware button operatively coupled to the computer processor mounted in the interior of the case.
8. The mobile assembly of claim 1, further comprising the first face being a curved surface such that the display surface follows a curvature of the curved surface of the first face.
9. The mobile assembly of claim 8, further comprising the case configured such that the first face is positioned opposite to the second face and the case has one or more third faces positioned between the first face and the second face.
10. The mobile assembly of claim 8 further comprising the case configured such that the first face is positioned opposite to the second face and the first and second faces are in contact with one another along at least one side of the case.
11. The mobile assembly of claim 10, wherein a degree of curvature of the curved surface is greater in a first surface region adjacent to said contact as compared to the degree of curvature of a second surface region spaced apart from said contact.
12. The mobile assembly of claim 11, wherein the second surface region is in a middle of the display surface.
13. The mobile assembly of claim 10, wherein the case comprises the first face as a first case panel and the second face as a second case panel, such that the first case panel and the second case panel connect with one another to form the interior and the display screen is the first case panel.
14. The mobile assembly of claim 13, wherein a degree of curvature of the curved surface is greater in a first surface region adjacent to said contact as compared to the degree of curvature of a second surface region spaced apart from said contact.

15. The mobile assembly of claim 14, wherein the second surface region is in a middle of the display surface.
16. The mobile assembly of claim 15, further comprising the display surface occupying ninety percent of a total panel surface area of the first case panel.
17. The mobile assembly of claim 8 further comprising the first face including:
the display screen; a support structure having the first display screen mounted thereon; and
a component location in the support structure for mounting the electronic component.
18. The mobile assembly of claim 17, wherein the component location is an aperture in the support structure.
19. The mobile assembly of claim 17, further comprising the first face including a touch screen layer mounted on top of the display screen.
20. The mobile assembly of claim 1, further comprising a touch screen layer mounted on top of the display screen.
21. The mobile assembly of claims 19 or 20, wherein a portion of the touch screen layer is positioned over the physical cut out region.
22. The mobile assembly of claim 1,
wherein using the location data to reformat the display data in to the second display format comprises repositioning a portion of the display data of the first display format determined as located within the cut out periphery to a position on the display surface located outside of the cut out periphery.
23. The mobile assembly of claim 22, wherein the portion of the display data includes text data.
24. The mobile assembly of claim 1,
wherein using the location data to reformat the display data in to the second display format comprises deleting a portion of the display data of the first display format determined as

located within the cut out periphery.

25. The mobile assembly of claim 24, wherein the portion of the display data includes picture data.

26. The mobile assembly of claim 25, further comprising the instructions when executed by the computer processor to implement the one or more operations of the display module to:

use the location data to reformat the display data in to the second display format by repositioning the portion of the display data to a position on the display surface located inside of the cut out periphery; and

provide the display instructions for the display data in the second display format to the display screen;

wherein a shape of the cut out periphery is provided as part of a design element in the picture data.

27. The mobile assembly of claim 26, wherein the design element is a defined geometrical shape positioned within a plurality of displayed text.

28. The mobile assembly of claim 27, wherein the defined geometrical shape is a circle.

29. The mobile assembly of claim 26, wherein the design element is a defined geometrical shape positioned within a plurality of geometrical shapes comprising the picture data.

30. The mobile assembly of claim 26, further comprising the instructions when executed by the computer processor to implement the one or more operations of the display module to: match the shape of the cut out periphery to a shape of the portion of the display data.

31. The mobile assembly of claim 1, wherein the display screen is a bi-stable screen.

32. The mobile assembly of claim 1, further comprising the display screen as a first display screen and a second display screen positioned on the second face providing the mobile device as a multi-screened device.

33. A method for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to:

- receive the display data in the first display format for displaying on a display surface;
- access location data of a physical cut out region defining a cut out periphery of a physical cut out region in the display surface; use the location data to reformat the display data in to the second display format by repositioning a portion of the display data of the first display format determined as located within the cut out periphery to a position on the display surface located outside of the cut out periphery; and
- send display instructions for the display data in the second display format for display on the display surface of a display screen; wherein the display data is restricted from being located in the physical cut out region by the display module.

34. A method for reformatting display data in a first format to display data in a second format, the method comprising instructions when executed by a computer processor to:

- receive the display data in a first display format for displaying on a display surface;
- access location data of a physical cut out region defining a cut out periphery of a physical cut out region in the display surface;
- use the location data to reformat the display data in to the second display format by deleting a portion of the display data of the first display format determined as located within the cut out periphery; and
- send the display instructions for the display data in the second display format for display on the display surface of a display screen.

35. The method of claim 34, wherein the portion of the display data includes picture data.

36. The method of claim 35, further comprising the instructions when executed by the computer processor to implement the one or more operations of the display module to:

- use the location data to reformat the display data in to the second display format by repositioning the portion of the display data to a position on the display surface located inside of the cut out periphery; and
- provide the display instructions for the display data in the second display format to the display screen;
- wherein a shape of the cut out periphery is provided as part of a design element in the

picture data.

37. The method of claim 36, wherein the design element is a defined geometrical shape positioned within a plurality of displayed text.

38. The method of claim 37, wherein the defined geometrical shape is a circle, a square, a triangle.

39. The method of claim 36, wherein the design element is a defined geometrical shape positioned within a plurality of geometrical shapes comprising the picture data.

40. The method of claim 36 further comprising the instructions when executed by the computer processor to implement the one or more operations of the display module to: match the shape of the cut out periphery to a shape of the portion of the display data.

41. A mobile assembly having:

- a case having a face;

- a display screen positioned on the face, the display screen configured for receiving display instructions used to position display data on a display surface of the display screen;

- an electronic component positioned on the face within a peripheral boundary of the display surface; and

- a virtual cut out region in the display surface, the virtual cut out region located on the face about a selected position within the peripheral boundary by a display module

- a computer processor mounted in an interior of the case;

- a memory mounted in the interior of the case for storing instructions for execution by the computer processor to implement one or more operations of a display module to:

 - receive the display data in the first display format;

 - select location data of the virtual cut out region defining a virtual cut out periphery of the virtual cut out region;

 - use the location data to reformat the display data in to a second display format; and

 - provide the display instructions for the display data in the second display format to the display screen.

42. The mobile assembly of claim 1, wherein a portion of the peripheral edge of the cut out

region overlaps with a portion of the peripheral boundary of the display surface.

43. The mobile assembly of claim 1, wherein the display surface fills the whole case.

44. The mobile assembly of claim 1, further comprising a second display screen coupled to the one or more computer processors.

45. The mobile assembly of claim 1, wherein the case has no visible buttons.

46. The mobile assembly of claim 1, wherein the mobile assembly is a mobile cover.

47. The mobile assembly of claim 1, wherein the mobile assembly is a mobile device.

48. The mobile assembly of claim 1, wherein the mobile assembly is a mobile cover coupled to a mobile device.

49. A method for reformatting display data in a first format to display data in a second format, the method comprising:

- instructions when executed by a computer processor to: receive the display data in the first display format for displaying on a display surface;

- select location data of a virtual cut out region defining a virtual cut out periphery of a virtual cut out region in the display surface; use the location data to reformat the display data into the second display format by repositioning a portion of the display data of the first display format determined as located within the virtual cut out periphery to a position on the display surface located outside of the virtual cut out periphery; and

- send display instructions for the display data in the second display format for display on the display surface of a display screen;

- wherein the display data is restricted from being located in the virtual cut out region by the display module.

50. A method for reformatting display data in a first format to display data in a second format, the method comprising:

- instructions when executed by a computer processor to: receive the display data in a first display format for displaying on a display surface;

select location data of a virtual cut out region defining a virtual cut out periphery of a virtual cut out region in the display surface; use the location data to reformat the display data into the second display format by deleting a portion of the display data of the first display format determined as located within the virtual cut out periphery; and

send the display instructions for the display data in the second display format for display on the display surface of a display screen.