An electronic device protective cover that includes a substantially rigid screen protector panel. The electronic device cover attaches by snap-on connection over a portion of the electronic device. The protective cover can optionally secure to a base by a snap-on connection to form a multi-component protective system.
SNAP-ON PROTECTIVE COVER FOR ELECTRONIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS


TECHNICAL FIELD

[0002] The present invention relates generally to the field of protective covers and cases for electronic devices, and more particularly to an ultra-thin injection molded cover and base for an electronic device for preventing damage to a touch screen, display screen or other parts of the device, which snaps onto the device for ease of attachment and removal, and which provides good optical and touch-screen interface characteristics.

BACKGROUND

[0003] Many electronic communication devices exist today which allow users to communicate with others or exchange information and content via a communications network or service. For example, cellular telephones, smart telephones, tablet computers, readers, MP3 players, and other electronic devices are available in various forms. These devices are often expensive and users typically want to protect the condition of their device in a case or housing.

[0004] For many users, some commercially-available electronic device cases can be undesirably bulky or large when used with an electronic device. Electronic devices with touchscreens are typically encased with a protective shell or covering that leaves the touchscreen open to interaction with the user. Many users typically place a protective film layer or adhesive material over said touchscreen to protect it from getting scratched or damaged. Some commercially-available protective films can be cumbersome to install or remove, and air bubbles can be trapped between the film and the screen detracting from appearance and/or performance.

[0005] Thus, it can be seen that needs exist for improved protective devices that allow use of an electronic device, for example use of a display screen and/or a touch screen user interface of an electronic device, yet provide improved ease of installation and removal and protection to the device. It is to the provision of an improved protective cover for electronic devices meeting these and other needs that the present invention is primarily directed.

SUMMARY

[0006] In example embodiments, the present invention provides a single-piece, ultra-thin, injection-molded snap-on protective cover for installation over a screen or other component(s) of an electronic device such as a cell phone, smart phone, reader, MP3 player, tablet computer or the like. In example forms, the cover is at least partially transparent to allow viewing of a display of the device therethrough. In further examples, at least a portion of the cover is sufficiently thin and transmissive of user input to allow operation of a touch-screen user interface of the electronic device through the cover material. In further example forms, the cover has snap-on connection features to allow the user to easily attach and remove the cover from the electronic device. In alternate example forms, the cover snaps onto or into another element of a multi-component case or cover assembly, for example having snap connections to a back case component of a protective system for an electronic device.

[0007] In one aspect, the present invention relates to a protective cover for an electronic device. The protective cover includes a screen protector panel and at least one sidewall panel extending from the periphery of said screen protector panel. The electronic device cover attaches by snap-on connection over a portion of the electronic device. At least a portion of the screen protector panel is of a thickness sufficiently thin to allow for a user to interact with a touchscreen of the electronic device therethrough.

[0008] Optionally, the device cover is installed by snap fitting the at least one protective cover sidewalls into engagement with cooperating surfaces or engagement features such as recesses or projections of the electronic device. In example forms, the thickness of the screen protector is between 0.5 mm to 1.0 mm thick. In further example forms, the electronic device cover is made of a material selected from polycarbonate, acrylonitrile-butadiene-styrene, or other substantially transparent material. In touchscreen applications, the thickness and material are selected to allow effective transmission of a user input to a touchscreen through the cover, for example being transmissive of pressure and deformation for resistive touchscreens, transmissive of capacitive electronic charge for capacitive touchscreens, and/or transmissive of acoustic wave signals for surface acoustic wave transducer touchscreen systems, without the cover causing significant degradation of touchscreen performance relative to an uncovered touchscreen.

[0009] Example embodiments include panels having an inwardly-extending ledge projecting from the sidewall to clasp over the sides and against the back edge of the electronic device when attached onto the device. These ledges can optionally have a depth of less than 1 mm to about 1 inch, depending upon the electronic device intended to be covered. The screen protector can optionally include one or more aperture(s) therethrough to allow a user to operate controls of the electronic device, for camera operation, and/or for transmission of sound to/from a microphone and/or speaker of the device. The at least one sidewall can optionally be contoured and shaped to fit the outer periphery of the electronic device with a close-fitting snap-on connection. The cover can optionally include a base that is removably secured with respect to the at least one sidewall opposite from the screen protector panel.

[0010] In another aspect, the invention relates to a method of protecting an electronic device from damage. The method includes securing a hard shell protective cover over at least a screen portion of the electronic device. The hard shell protective cover preferably includes a screen protector panel and at least one sidewall extending therefrom. Optionally, the protective cover can include a pressure-sensitive panel with dimensions corresponding to the electronic device screen portion. In applications wherein the electronic device has a touchscreen, the method preferably also includes operating the touchscreen through the protective cover’s pressure-sensitive panel.

[0011] The protective cover optionally includes at least one aperture, and the method optionally further includes access-
ing or operating at least one control or other feature of the electronic device through the aperture in screen protector. As a further option, the at least one protective cover sidewall includes an inwardly-extending lip to engage a corresponding surface of the electronic device during the snap fitting step, and the method optionally also includes securing the protective cover and the electronic device with respect to a base.

[0012] In still another aspect, the invention relates to a protective cover for an electronic device. This protective cover can include a screen protector panel capable of being snap-fitted onto or into removable, semi-permanent or permanent engagement with the electronic device. The screen protector panel optionally includes at least one recess or aperture in a front or back face thereof, and the cover includes at least one insert component secured into or onto the recess or aperture. This insert can be secured to the screen protector panel with adhesive or can be insert-molded to the careen protector panel. The screen protector panel can also optionally include a base panel that is configured to secure with respect to the screen protector panel opposite the electronic device.

[0013] These and other aspects, features and advantages of the invention will be understood with reference to the drawing figures and detailed description herein, and will be realized by means of the various elements and combinations particularly pointed out in the appended claims. It is to be understood that both the foregoing general description and the following brief description of the drawings and detailed description of the invention are exemplary and explanatory of preferred embodiments of the invention, and are not restrictive of the invention, as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view of a protective snap-on cover for an electronic device according to an example embodiment of the present invention.

[0015] FIG. 2 is a front view of the protective cover of FIG. 1.

[0016] FIG. 3 is a left side view of the protective cover of FIG. 1.

[0017] FIG. 4 is a right side view of the protective cover of FIG. 1.

[0018] FIG. 5 is a top view of the protective cover of FIG. 1.

[0019] FIG. 6 is a bottom view of the protective cover of FIG. 1.

[0020] FIG. 7 is a cross sectional view of the protective cover of FIG. 1 taken along the line A-A.

[0021] FIG. 8 shows a protective cover being fitted onto an electronic device according to an example embodiment of the present invention.

[0022] FIG. 9 is a front view of a protective cover according to another example embodiment of the present invention.

[0023] FIG. 10 is an assembly view of a protective cover being fitted onto an electronic device and also fitted into a base cover component of a multi-part protective system.

[0024] FIG. 11 is an isolated perspective view of the base cover component of FIG. 10.

[0025] FIG. 12 is a perspective view of the protective cover secured to the base cover and forming a multi-part protective system for an electronic device.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

[0026] The present invention may be understood more readily by reference to the following detailed description of the invention taken in connection with the accompanying drawing figures, which form a part of this disclosure. It is to be understood that this invention is not limited to the specific devices, methods, conditions or parameters described and/or shown herein, and that the terminology used herein is for the purpose of describing particular embodiments by way of example only and is not intended to be limiting of the claimed invention. Any and all patents and other publications identified in this specification are incorporated by reference as though fully set forth herein.

[0027] Also, as used in the specification including the appended claims, the singular forms "a," "an," and "the" include the plural, and reference to a particular numerical value includes at least that particular value, unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" or "approximately" one particular value and/or to "about" or "approximately" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent "about," it will be understood that the particular value forms another embodiment.

[0028] With reference now to the drawing figures, wherein like reference numbers represent corresponding parts throughout the several views, FIGS. 1-6 show a protective cover 10 for an electronic device according to an example embodiment of the invention. The cover 10 includes a screen protector or front panel portion 20 and one or more peripheral sidewall portions 30 extending transversely from the perimeter of the screen protector panel 20. The phone cover 10 can comprise polycarbonate (PC), acrylonitrile-butadiene-styrene (ABS), acrylic (PMMA), thermoplastic urethane (TPU), and/or any other suitable material(s), preferably at least partially of a material that is transparent and substantially rigid, but having a sufficient degree of flexibility and resilience to provide toughness and transmissibility of user inputs. As opposed to flexible film screen covers, the substantially rigid cover of the present invention is preferably stiff and self-supporting, retaining its shape under light hand pressure without significant deformation, allowing the cover to snap fit onto an electronic device and be retained on the electronic device under its own structural resilience without need for adhesive or static cling or surface contact adhesion. The phone cover 10 can be manufactured by injection molding, thermoplastic elastomeric overmolding, and/or other suitable manufacturing processes. In example forms, the screen protector panel 20 and the peripheral sidewall portion(s) 30 of the cover 10 are formed as a one-piece, integral, unitary, injection-molded, ultra-thin walled shell, for example having a wall thickness of about 0.4 mm to 0.8 mm or less.

[0029] The screen protector panel 20 can optionally include one or more apertures 22 positioned therein. The apertures 22 allow a user to directly contact or otherwise operate or interact with input/output controls, speakers, microphones or other components of an electronic device that the protective cover 10 is used with. The screen protector panel 20 in the depicted embodiment is generally rectangular shaped with rounded corners, adapted to fit snugly over an electronic device of corresponding and complementary shape, but i
alternate embodiments may have other shapes and sizes configured for use with alternative electronic devices. The screen protector 20 is preferably constructed at least in part of a thin, flat panel of material, preferably no more than about 0.5 mm to 1.0 mm thick. If a touchscreen electronic device is used with the phone cover 10, the small thickness of the screen protector 20 and the transmissiveness of the material(s) of construction allow the user to interact with the touchscreen while the phone cover 10 is on the electronic device. The screen protector 20 is preferably formed of a hard, water-resistant, scratch-resistant, and impact resistant material to protect the screen of the electronic device in conjunction with which the phone cover 10 is used.

[0030] The peripheral sidewall panel(s) 30 can optionally also include one or more apertures 32 extending therethrough. The apertures 32 allow a user to directly contact and operate or interact with an electronic device that the protective cover 10 is installed on, by accessing side ports and/or controls of the device through the openings 32 in the cover. The sidewall 30 in this embodiment extends along a portion of the periphery of the screen protector panel 20. Generally, the sidewall 30 extends along the left and right side of the screen protector panel 20, while the sidewall 30 is absent along a majority of the top and bottom of the screen protector panel 20. In alternate embodiments, a single continuous sidewall panel having angled or radiusd corners can extend substantially about the periphery of the cover 10, or alternatively two or more separate sidewall panels can extend from discrete sections of the cover along one or both sides and/or one or both of the top and bottom of the screen protector panel.

[0031] FIG. 7 shows a cross-sectional view of the phone cover 10 taken along the line A-A of FIG. 2. The cross section of the sidewall 30 is manufactured and shaped to fit and grip an electronic device therein, between sidewall portions thereof, to secure the cover to the device with the screen protector overlying and immediately adjacent or in contact with the display screen or touchscreen of the electronic device. A ledge or lip 34 protrudes transversely inwards from the distal end of at least a portion of the sidewall panel(s) 30. As depicted, the ledge or lip 34 can extend generally parallel to the screen cover panel 20. The distance which the ledge or lip 34 extends inwards from the sidewall panel 30 can vary, for example between less than about 1 mm to greater than about 1 inch, depending on the intended application. In use, a side of a handheld electronic device is secured between the ledge or lip 34 and the screen protector panel 20. The ledge or lip 34 can optionally include an inwardly directed (i.e., toward the screen protector panel 20) flange or clip 36 that clips into or onto a corresponding surface feature of a particular design of an electronic device for which the cover 10 is adapted for use.

[0032] FIG. 8 shows the protective cover 10 being attached onto an electronic device E. The electronic device E in this embodiment is shown as an Apple iPhone 4, but the protective cover of the present invention can be adapted for compatibility and use with various other designs and sizes of electronic devices, and is not limited to the particular format depicted. The cover 10 is positioned over the top of the electronic device E, with the screen cover portion 20 overlaying the display screen of the electronic device, and pressed onto the device. The sidewall 30 flexes slightly to receive the electronic device, and resiliently snaps back to engage with the periphery of the electronic device E. In this manner, the front face (containing the display or touchscreen) and at least a portion of one or more sides of the electronic device are covered and protected by the cover 10, whereas the back of the electronic device is substantially uncovered. In the depicted embodiment, the opposed lateral sides of the electronic device are substantially covered, whereas the top and bottom ends of the device are substantially uncovered.

[0033] The contour of the side wall 30 generally matches the outer contour of the periphery of the electronic device E, helping to create a close gripping fit between the sidewall 30 and the electronic device E. The ledge 34, and optionally the flange 36, of the sidewall 30 clasp and hold the cover 10 against the back face of the electronic device E, helping to prevent the phone cover 10 from accidentally falling off the electronic device E. When the phone cover 10 is snugly fit onto the electronic device E, the touchscreen on the electronic device is still able to be used through the screen protector 20, due to the pressure-sensitive thickness and transmissive material of the screen protector being selected such that the touchscreen can still register an interactive action delivered through pressure applied by the user.

[0034] FIG. 9 shows a protective cover 110 according to another example embodiment of the present invention. The depicted protective cover 110 is substantially similar to the protective cover 10 described above, including a screen protector panel 120, with one or more apertures 122 positioned thereon. One or more material inserts 124 are applied or secured, for example near the top and/or bottom of the screen protector panel 120. The material inserts 124 are preferably made from silicone, rubber, or another flexible and resilient material. The material inserts 124 can include one or more flexible outlines or sections of reduced thickness 126 that distinguish where a button, speaker, microphone or other component of an electronic device is located. The area within the flexible outlines 126 is displaceable in a direction perpendicular with respect to the plane of the protective cover 110. In other embodiments, material inserts 124 can be used as decorative trim or as protective layering that cushions the electronic device against impacts. The inserts 124 can be insert-molded with the remainder of the cover 110, or can be separately formed and attached by adhesive or other attachment means. Optionally the screen protector panel 120 comprises a recess or a raised flange for receiving and/or surrounding some or all of the inserts 124 for improved attachment and appearance.

[0035] FIG. 10 shows a protective cover 10 substantially as described above being attached to an electronic device E similarly to FIG. 8, and further being secured within a back protective shell or base 130 to form a multi-component protective system for an electronic device. FIG. 11 shows the base 130 in isolation. The depicted base 130 receives the electronic device E that is secured within the protective cover 10. The depicted base 130 includes a base panel portion 132 and one or more peripheral sidewall portions 134 extending transversely from the perimeter of the base panel portion 132. The depicted base 130 can be made of polycarbonate (PC), acrylonitrile-butadiene-styrene (ABS), acrylic (PMMA), thermoplastic urethane (TPU), and/or any other suitable material(s), preferably at least partially of a material that is tough and resilient to protect the electronic device from impacts. The depicted base 130 can be manufactured using injection molding, thermoplastic elastomeric overmolding, and/or other suitable manufacturing processes. In example forms, the base 130 is formed as an injection-molded shell, with a thickness of between about 0.1 mm-2.0 mm.
The base panel 132 optionally comprises one or more apertures 136 positioned thereon. The one or more apertures 136 can for example provide a window for a digital camera or other vision-capturing components of an electronic device with which the protective cover 10 and base 130 are used. The base panel 132 in the depicted embodiment is generally rectangular shaped with rounded corners. The base panel 20 is preferably constructed at least in part of a thin, flat panel of material, preferably no more than about 0.5 mm to 2.0 mm thick. The base panel 132 is preferably water resistant and impact resistant to protect the back surface of the electronic device in conjunction with which the base 130 is used.

The peripheral sidewall panel(s) 134 can optionally include one or more cutouts 138 positioned thereon. When the cover 10 is secured within the base 130, the one or more cutouts align with the peripheral sidewall apertures 32 of the cover. The cutouts 138 provide access to side ports and/or controls of the electronic device E with which the base 130 is used. The sidewall 134 in this embodiment extends along a portion of the periphery of the base panel 132. Generally, the sidewall 132 extends along the left and right side of the base panel 132, while the sidewall 134 is absent along a majority of the top and bottom of the base panel. A single continuous sidewall panel having angled or radiused corners can extend substantially about the periphery of the base 130, or alternatively two or more separate sidewall panels can extend from discrete sections of the cover.

The cross section of the sidewall 134 is manufactured and shaped to fit and grip the sidewall 30 of the cover 10 that is secured over the electronic device E. The inner contour of the sidewall 134 generally matches the outer contour of the periphery of the cover 10, helping to create a close gripping fit between the base sidewall and the cover sidewall 30. The sidewall 134 flexes slightly to receive the cover 10 that is secured over the electronic device E, and resiliently snaps back to engage with the periphery of the cover. In this manner, the back face and at least a portion of one or more sidewalls 30 of the cover 10 are covered and protected by the base 130. In the depicted embodiment, the opposed lateral sides of the electronic device E are substantially covered, whereas the top and bottom ends of the device are substantially uncovered. While the depicted embodiment shows the front cover 10 being received within the back base 130, in alternate embodiments the back base may be installed first onto the electronic device, and the front cover installed over the sides of the back base.

Similarly to the ledge 34 in the cover, the base 130 optionally includes a ledge or lip 140 that protrudes transversely inwards from the distal end of the sidewall panel 134. The ledge or lip 140 can protrude generally parallel to, or at an angle slightly upward from the horizontal of, the base panel 132. The distance which the ledge or lip 140 protrudes from the sidewall panel 134 can vary, for example between less than about 1 mm to greater than about 1 inch. In use, the cover sidewall 30 fits within the height between the cover 132 and the ledge or lip 140 of the base sidewall 134. As depicted in FIG. 12, when the cover 10 is secured within the base 130, the ledge or lip 140 extends slightly over the exterior surface of the corner formed between the cover sidewall 30 and the screen protector 20. The ledge 140 of the sidewall 134 clasps and hold the cover 10 against the interior surface of the base cover 132, helping to prevent the phone cover 10 from accidentally falling out of the base 130.

In use, the protective cover of the present invention enables a method of protection of an electronic device. The front cover is installed with its screen cover portion over the screen of the electronic device, and the sidewall portions of the front cover secure with a snap fit onto the electronic device. Optionally, a back or base cover is installed to engage the front cover and form a multi-component protective system protecting substantially all surfaces of the electronic device from impacts, scratches and the like, while not interfering with user operation of the device.

While the invention has been described with reference to preferred and example embodiments, it will be understood by those skilled in the art that a variety of modifications, additions and deletions are within the scope of the invention, as defined by the following claims.

What is claimed is:

1. A protective cover for an electronic device, the protective cover comprising:
   a screen protector panel; and
   at least one sidewall panel extending from the periphery of said screen protector panel, said protective cover attaching by snap-on connection with a portion of the electronic device to retain the protective cover on the electronic device.

2. The protective cover of claim 1, wherein at least a portion of the screen protector panel is of a thickness sufficiently thin to allow for a user to interact with a touchscreen of the electronic device therethrough.

3. The protective cover of claim 2, wherein the thickness of the screen protector panel is no more than about 0.5 mm to 1.0 mm thick.

4. The protective cover of claim 1, comprising a material selected from polycarbonate, acrylonitrile-butadiene-styrene, acrylic, thermoplastic urethane or other substantially transparent material.

5. The protective cover of claim 1, wherein the at least one sidewall panel comprises an inwardly extending ledge to clasp the back of the electronic device when attached onto the device.

6. The protective cover of claim 5, wherein the ledge further comprises an inwardly extending flange to engage a corresponding surface of the electronic device and secure the cover to the electronic device.

7. The protective cover of claim 1, further comprising a base for removable attachment to the at least one sidewall opposite the screen protector panel.

8. The protective cover of claim 1, wherein the screen protector panel comprises at least one aperture therethrough to allow a user to operate controls of the electronic device.

9. The protective cover of claim 1, wherein the at least one sidewall is contoured and shaped to fit the outer periphery of the electronic device with a snap-on connection.

10. The protective cover of claim 1, wherein the screen protector panel and the at least one sidewall panel comprise a substantially rigid unitary element.

11. A method of protecting an electronic device from damage, the method comprising:
   securing a hard shell protective cover over at least a screen portion of the electronic device, the hard shell protective cover comprising a screen protector panel and at least one sidewall; and
   snap fitting the at least one protective cover sidewalls into engagement with cooperating surfaces of the electronic device.
device, wherein the screen protector panel is retained over the screen portion of the electronic device.

12. The method of claim 11, wherein the protective cover further comprises a pressure-transmissive panel with dimensions corresponding to the electronic device screen portion.

13. The method of claim 12, wherein the electronic device has a touchscreen, and wherein the method further comprises operating the touchscreen through the pressure-transmissive panel of the protective cover.

14. The method of claim 11, wherein the protective cover comprises at least one aperture in the screen protector panel.

15. The method of claim 14, wherein the electronic device has at least one control, and wherein the method further comprises accessing the at least one control through the at least one aperture in the screen protector panel.

16. The method of claim 11, further comprising securing a base onto the protective cover with the electronic device housed between the base and the protective cover.

17. A protective cover for an electronic device, the protective cover comprising:
   a screen protector panel having engagement features for snap-fit connection to cooperating features of an electronic device, the screen protector panel comprising at least one aperture; and
   at least one flexible insert secured to the at least one panel aperture.

18. The protective cover of claim 17, wherein the screen protector panel is substantially rigid.

19. The protective cover of claim 17, wherein the at least one flexible insert is secured to the screen protector panel with adhesive.

20. The protector cover of claim 17, wherein the at least one flexible insert is insert molded to the screen protector panel.

21. The protector cover of claim 17, further comprising a base panel, the base panel configured to secure with respect to the screen protector panel opposite the electronic device.