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Rostami

(54) **SYSTEM, APPARATUS AND METHOD FOR GENERIC ELECTRONIC DEVICE POWER MODULE AND CASE FORMATION**

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H04B 5/00 (2006.01)

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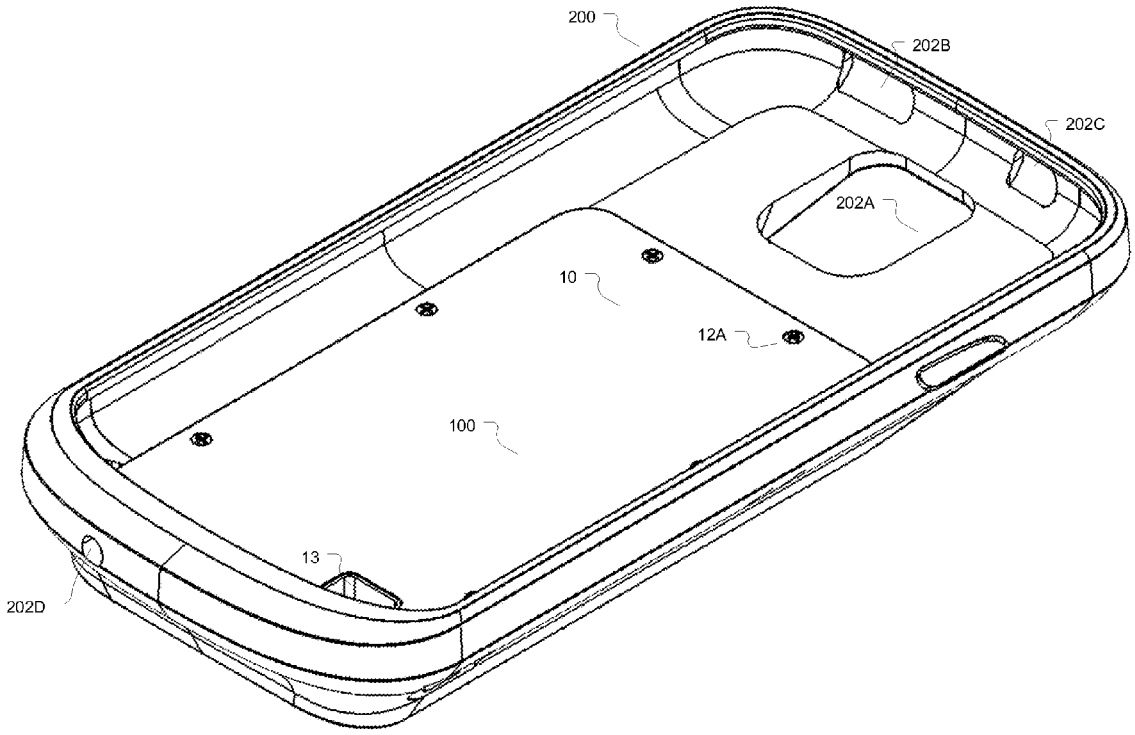
CPC ***H04B 1/3888*** (2013.01); ***H04B 5/0037*** (2013.01)

(57) **ABSTRACT**

A system and apparatus including a non-device specific power or data source module coupled to an extension module to form a case to protect specific devices and methods of forming same.



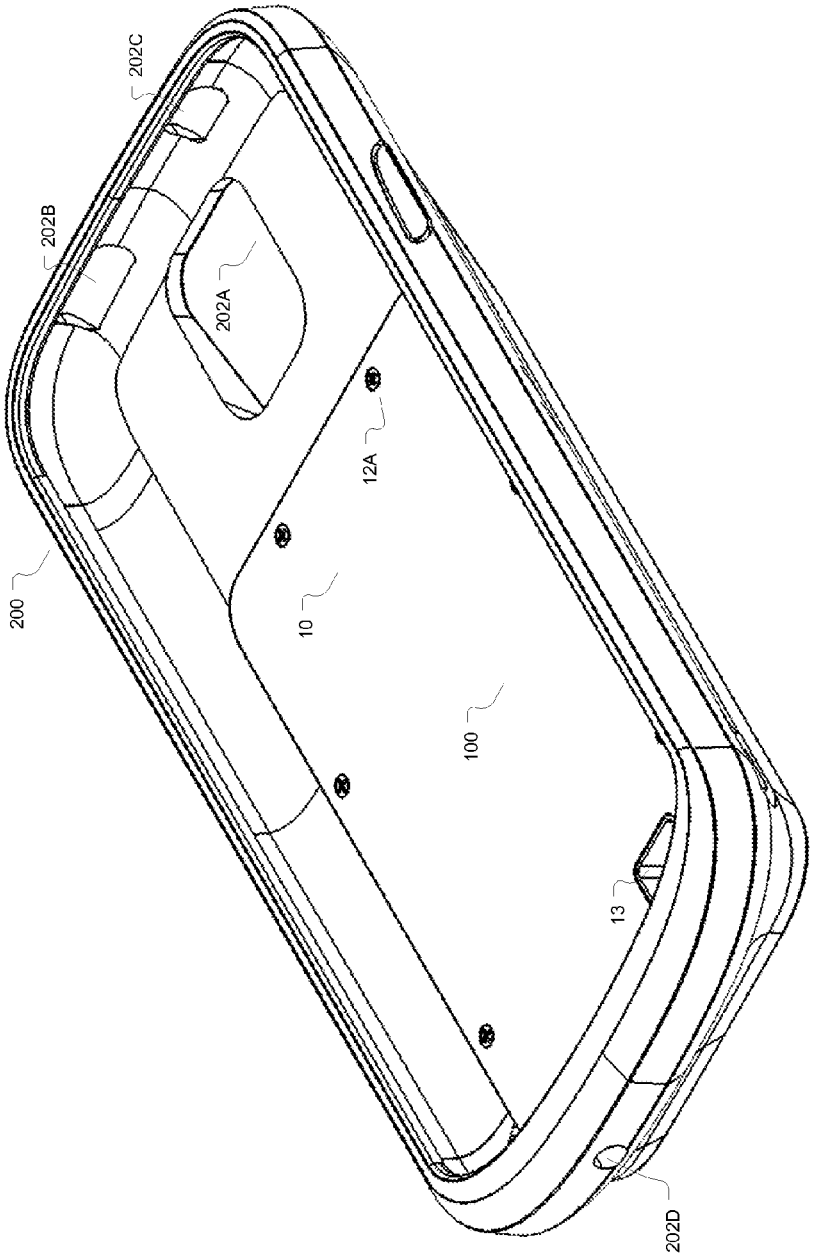


FIGURE 1A

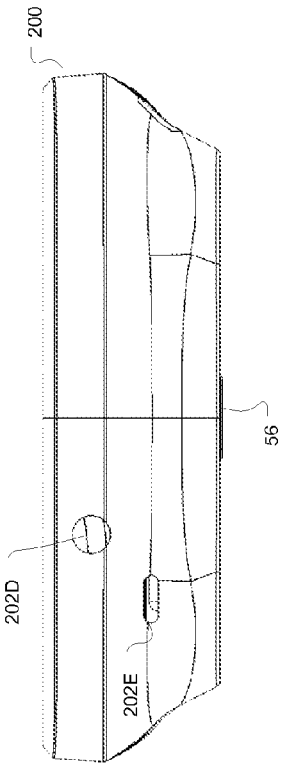


FIGURE 1B

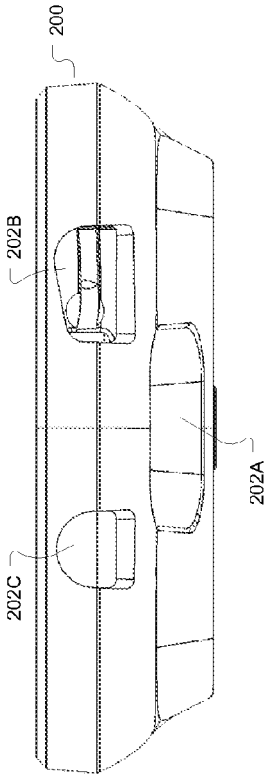


FIGURE 1C

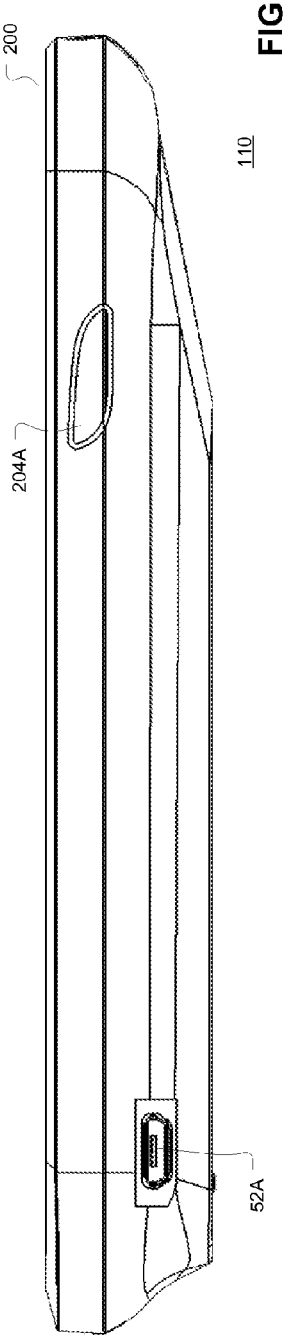


FIGURE 1D

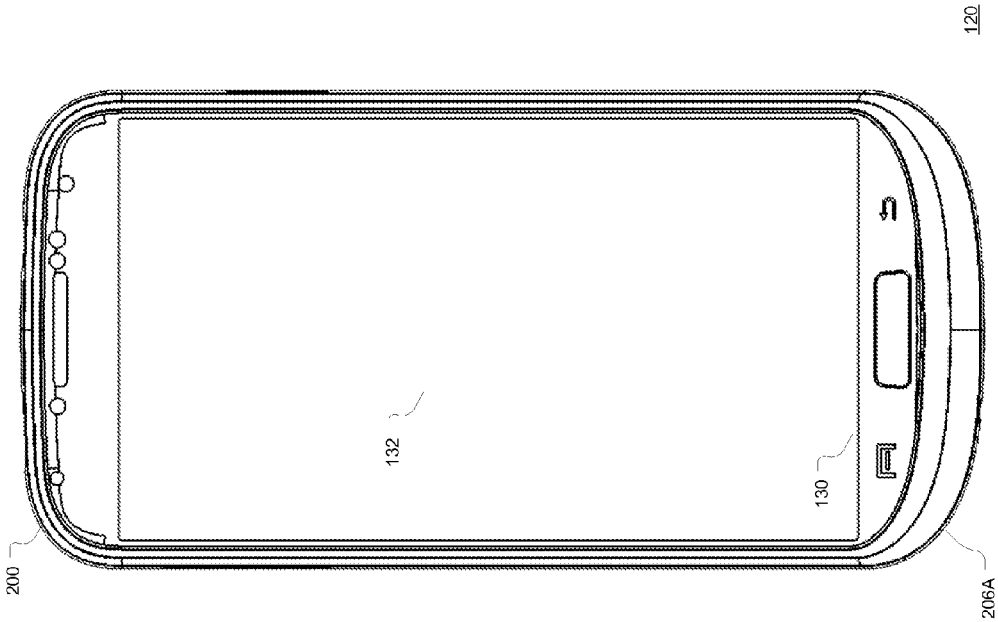


FIGURE 2

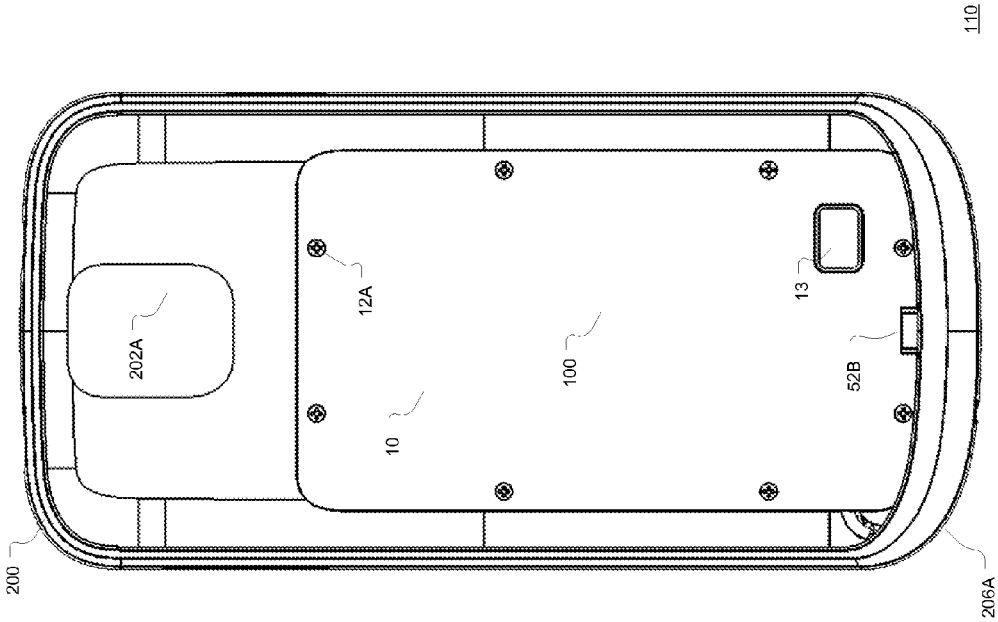


FIGURE 1E

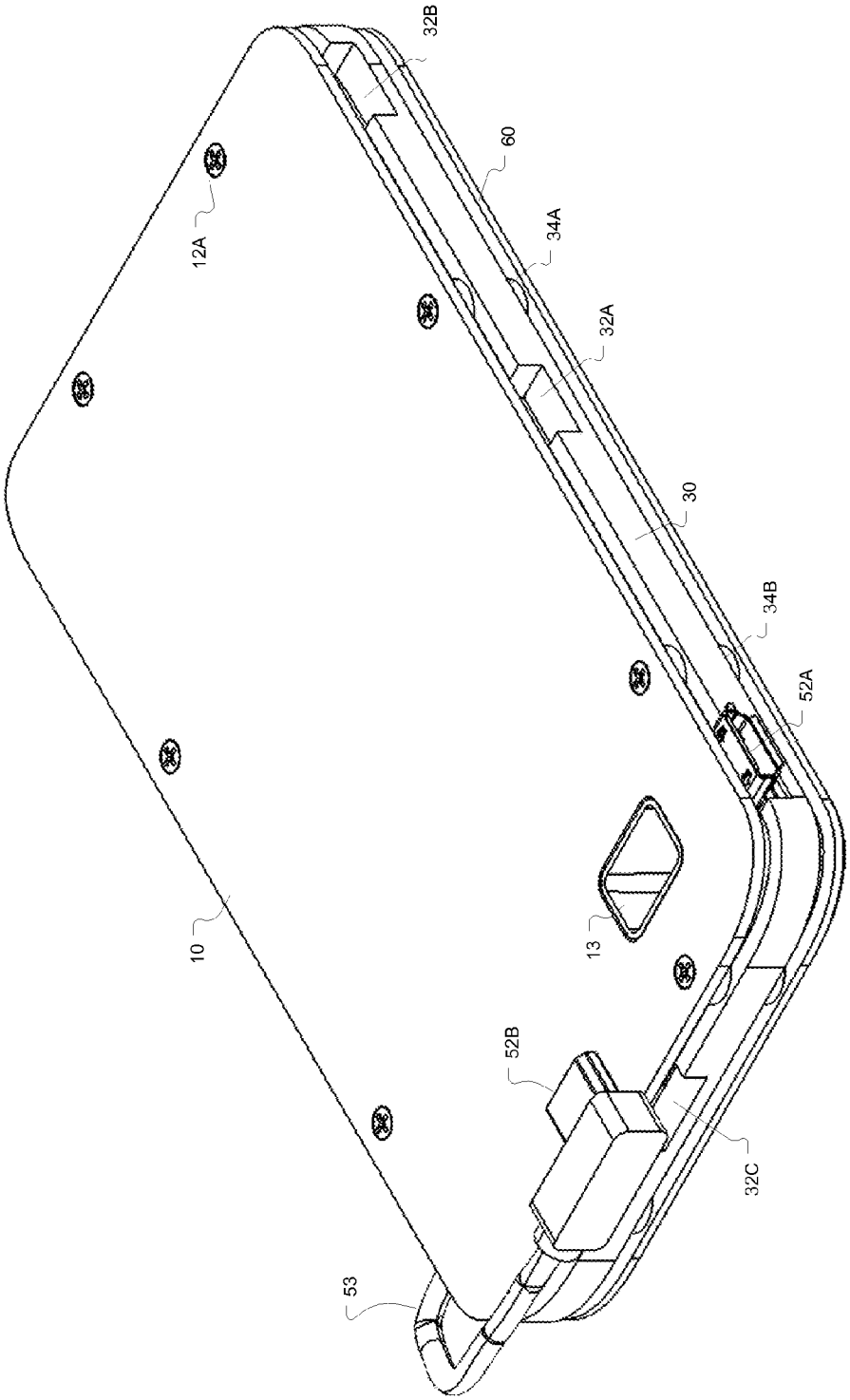


FIGURE 3A

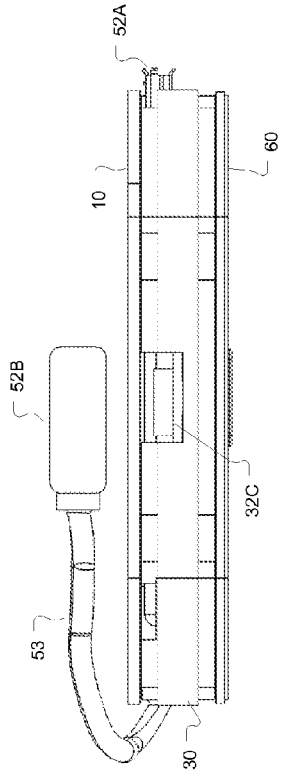


FIGURE 3B

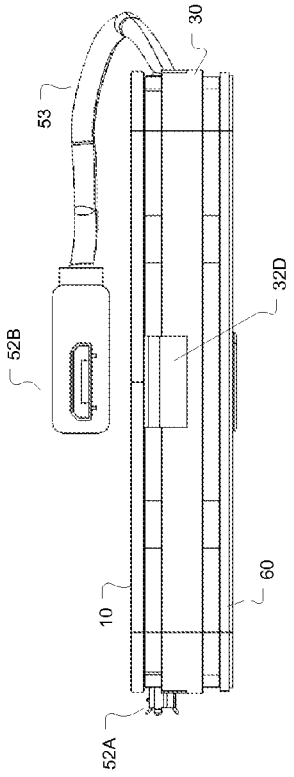


FIGURE 3C

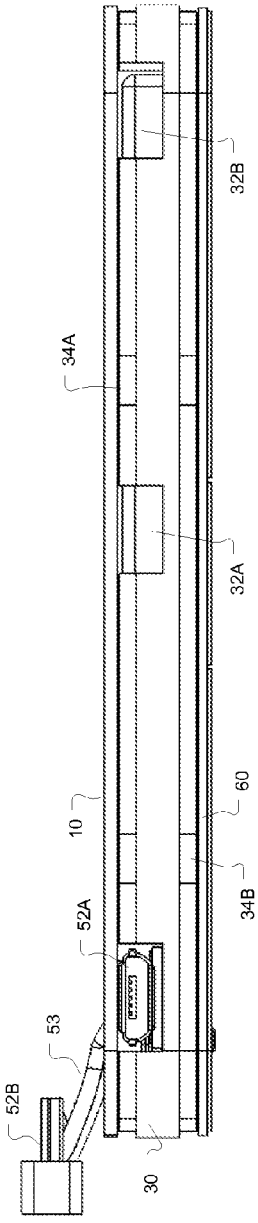


FIGURE 3D

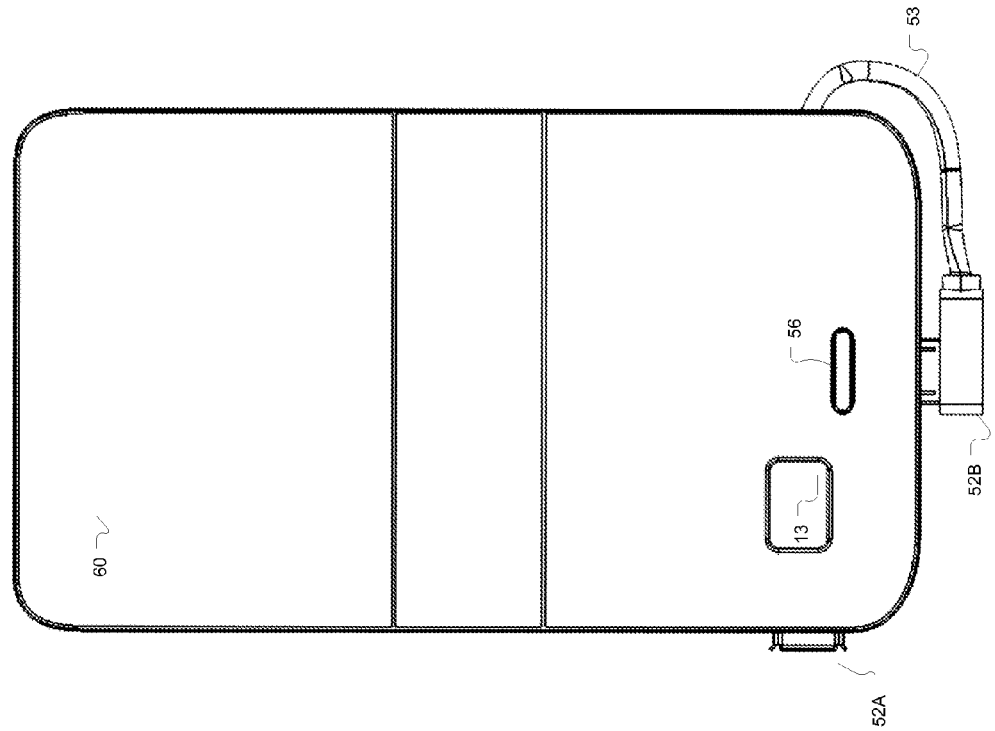


FIGURE 3F

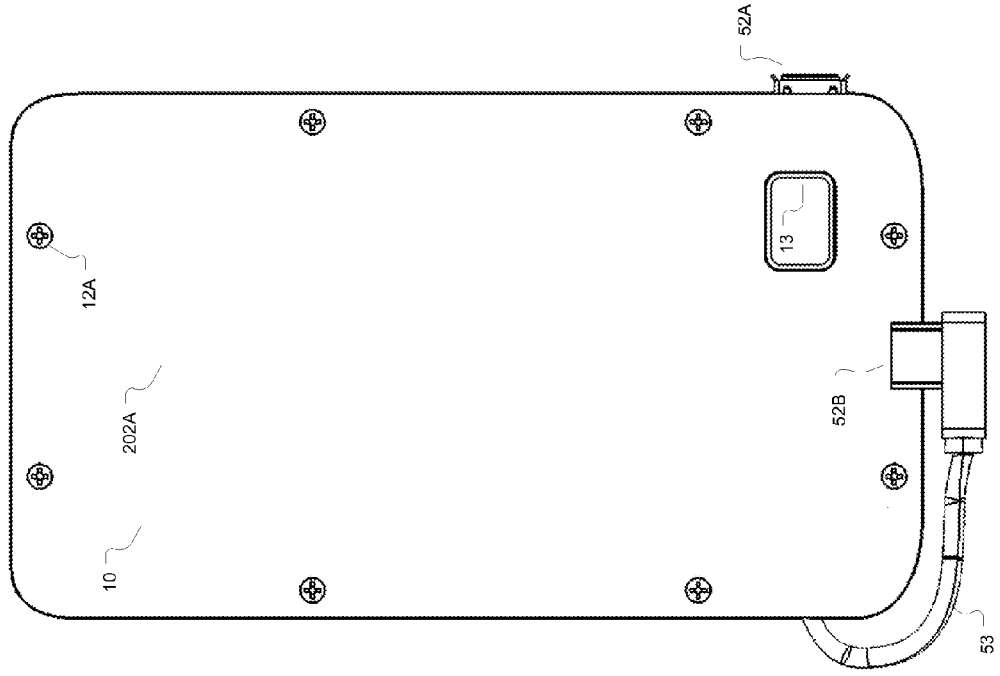


FIGURE 3E

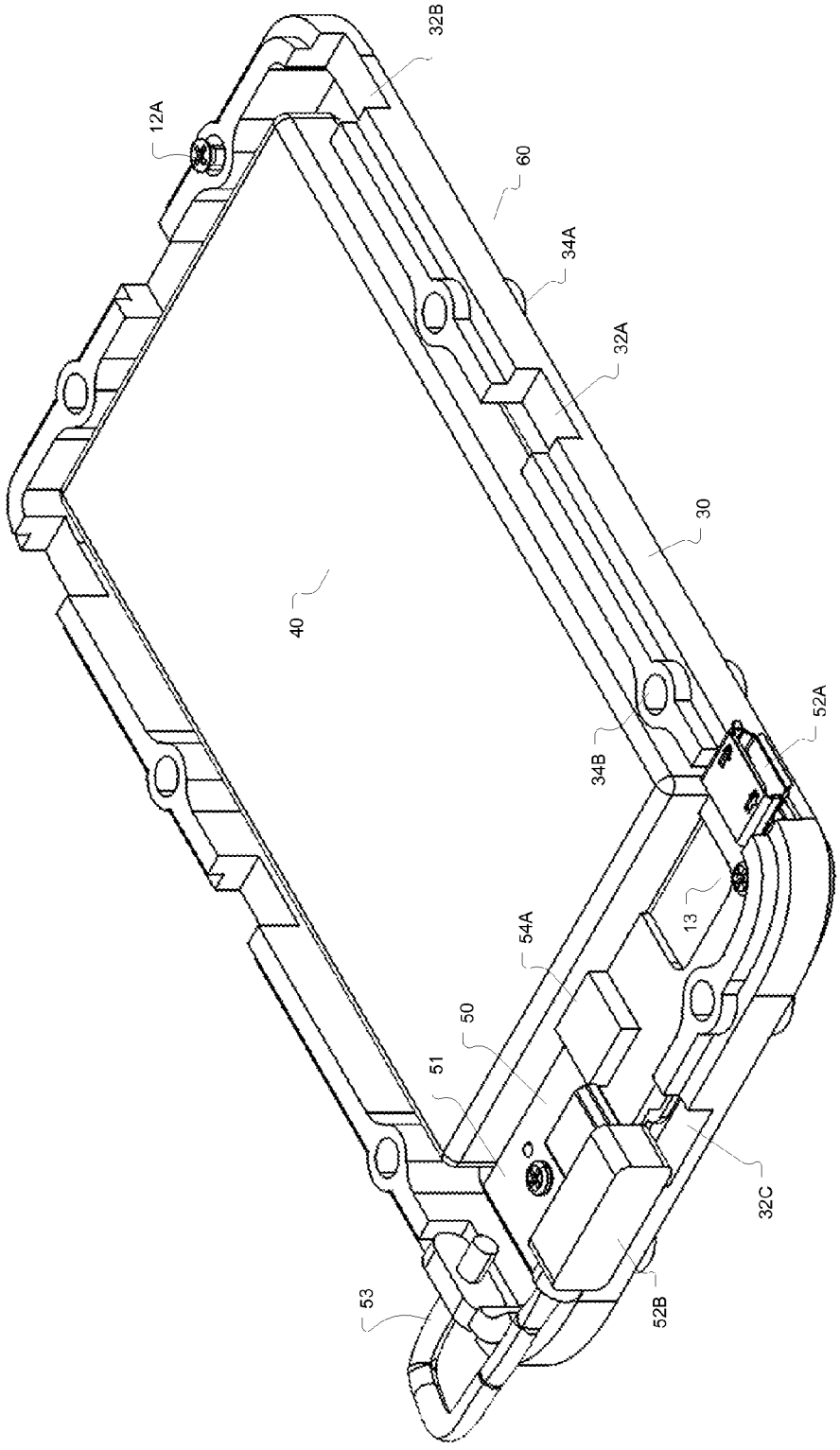


FIGURE 4A

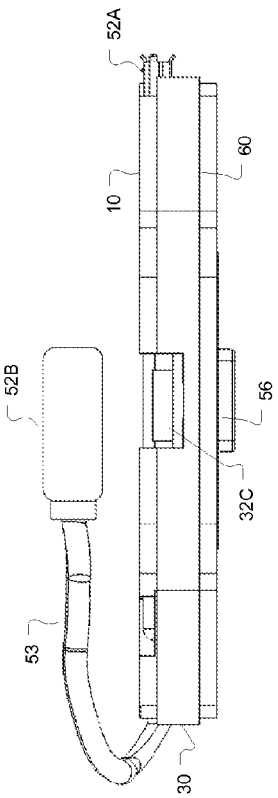


FIGURE 4B

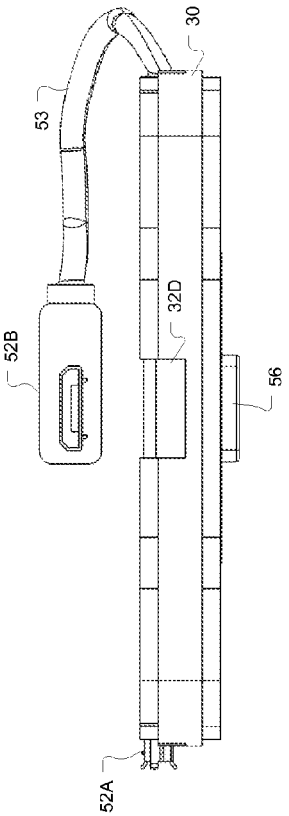


FIGURE 4C

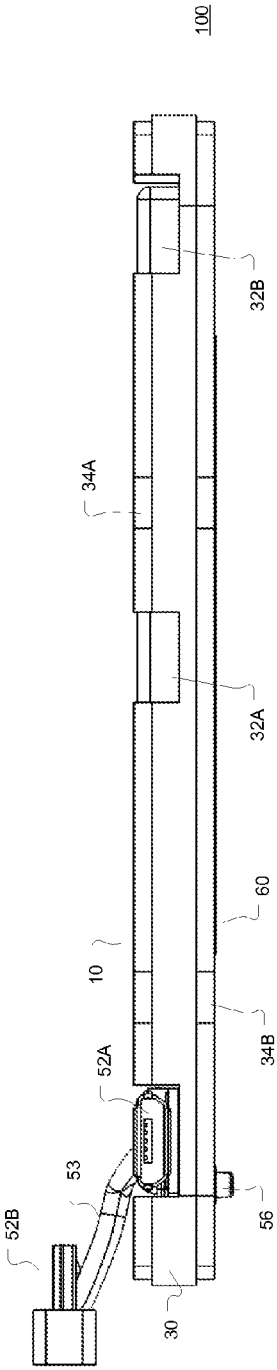


FIGURE 4D

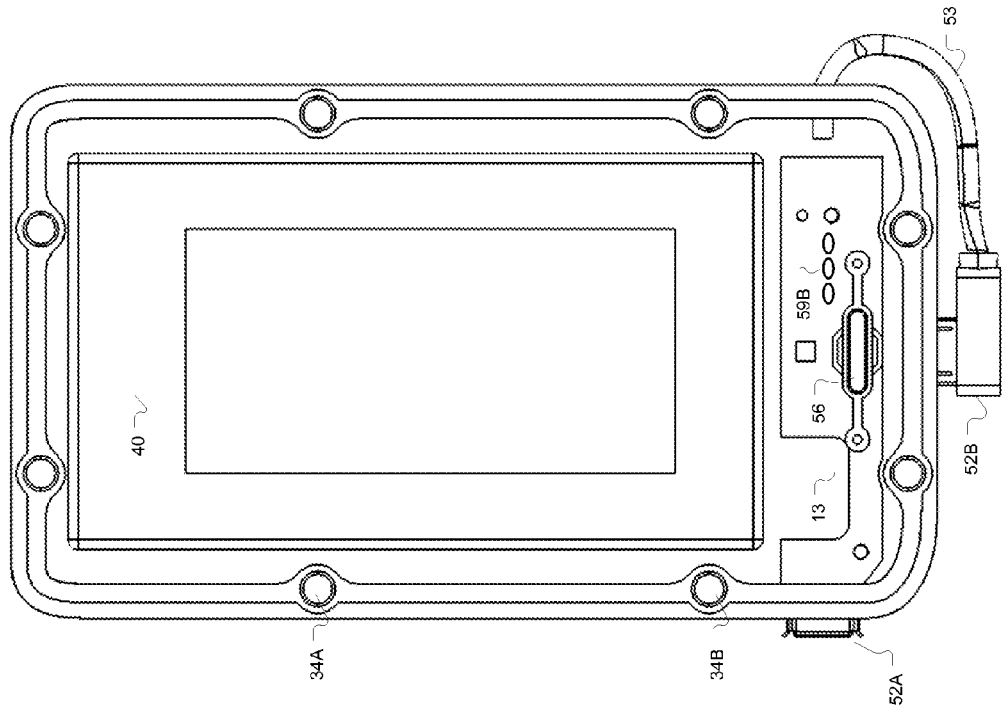


FIGURE 4F

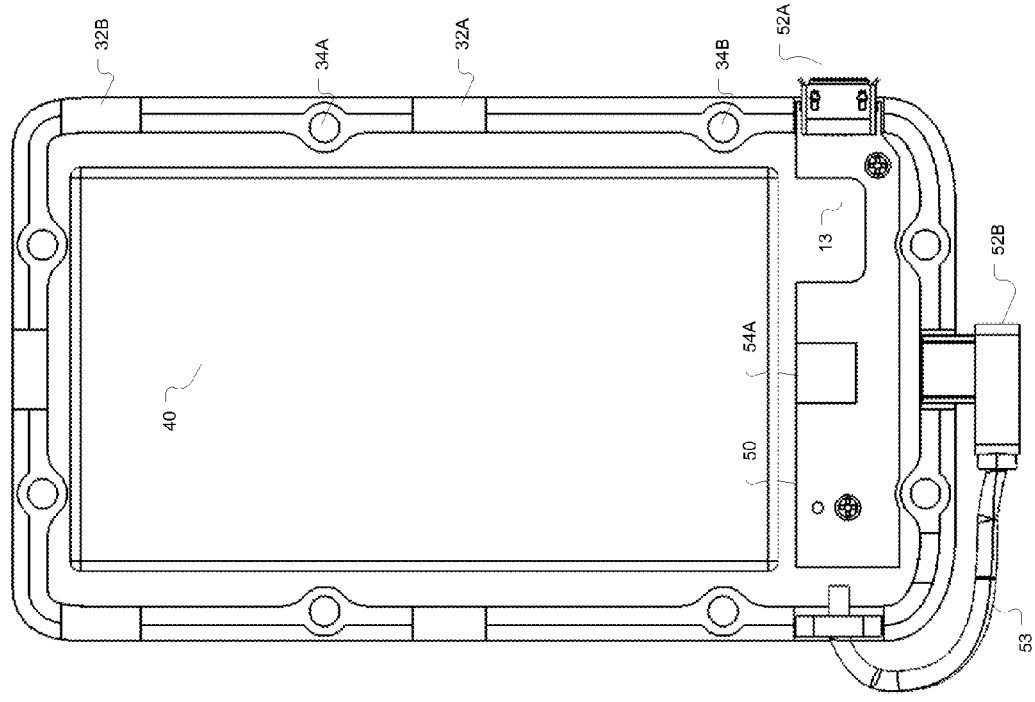


FIGURE 4E

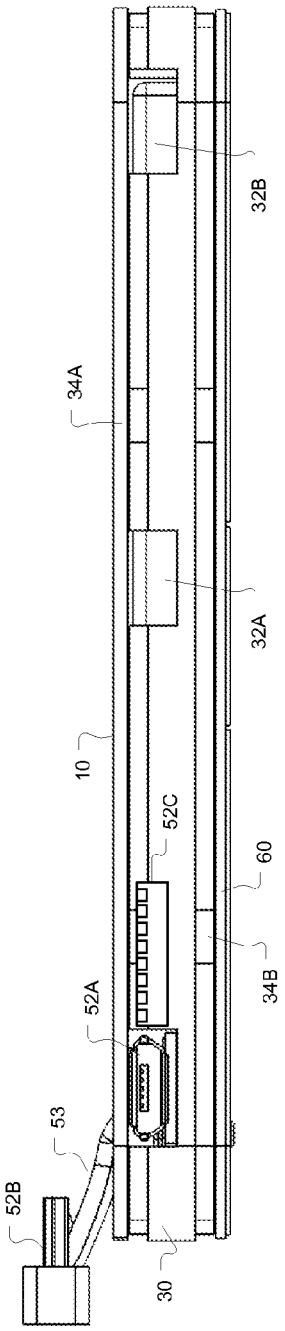


FIGURE 5A

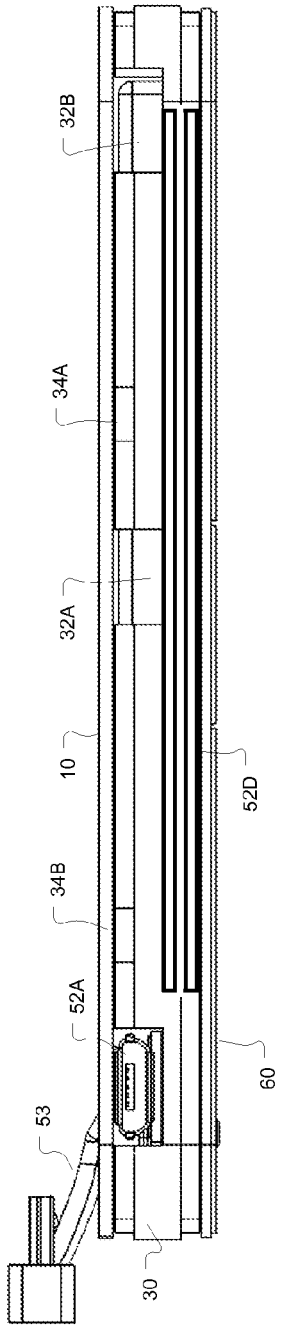


FIGURE 5B

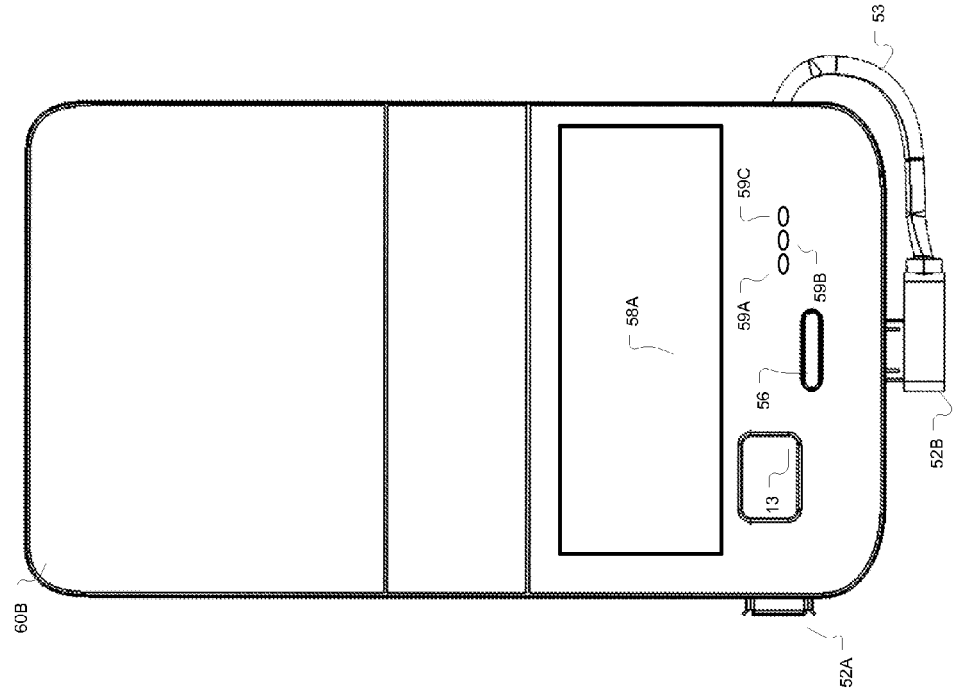


FIGURE 5D

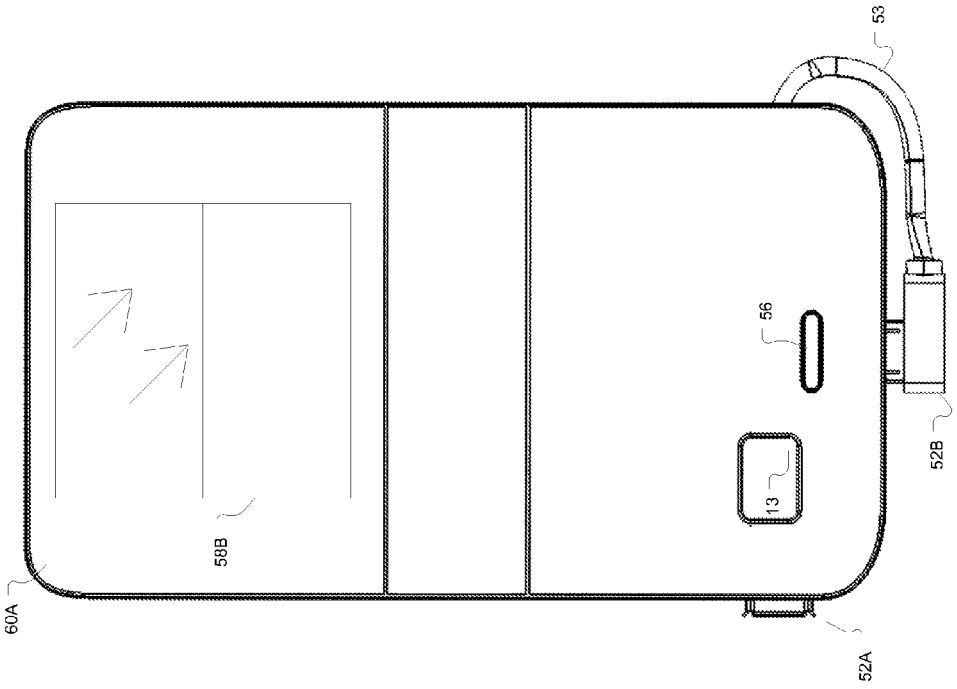


FIGURE 5C

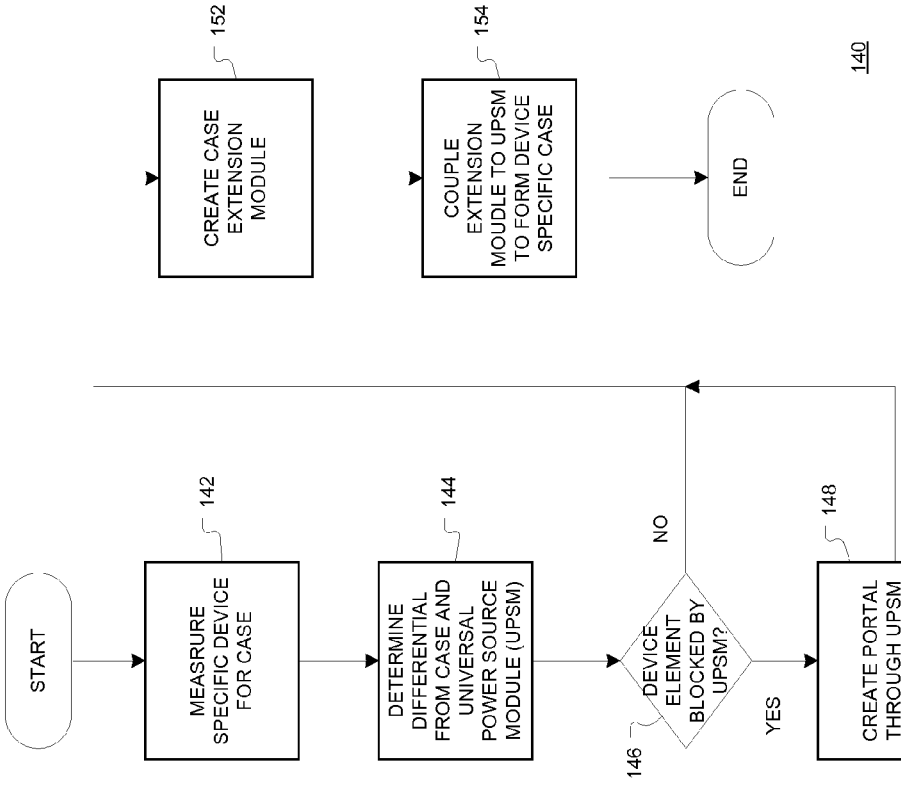

START
MEASRURE SPECIFIC DEVICE FOR CASE
142
DETERMINE DIFFERENTIAL FROM CASE AND UNIVERSAL POWER SOURCE MODULE (UPSM)
144
DEVICE ELEMENT BLOCKED BY UPSM?
146
NO
YES
CREATE PORTAL THROUGH UPSM FOR ELEMENT
148
CREATE CASE EXTENSION MODULE
152
COUPLE EXTENSION MOUDLE TO UPSM TO FORM DEVICE SPECIFIC CASE
154
END
140

FIGURE 6

SYSTEM, APPARATUS AND METHOD FOR GENERIC ELECTRONIC DEVICE POWER MODULE AND CASE FORMATION

TECHNICAL FIELD

[0001] Various embodiments described herein relate to apparatus for providing power or data with electronic devices via a device case that encloses and protects a portion of the device.

BACKGROUND INFORMATION

[0002] It may be desirable to provide a non-device specific power or data source module to be incorporated into a case that encloses and protects a specific device. The present invention provides modules, systems, methods, and apparatus for same.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] FIG. **1**A is an isometric diagram of a device specific case system including a universal power source module and extension module according to various embodiments.

[0004] FIG. **1**B is a bottom view diagram of a device specific case system including a universal power source module and extension module according to various embodiments.

[0005] FIG. **1**C is a top view diagram of a device specific case system including a universal power source module and extension module according to various embodiments.

[0006] FIG. **1**D is a side view diagram of a device specific case system including a universal power source module and extension module according to various embodiments.

[0007] FIG. **1**E is a front view diagram of a device specific case system including a universal power source module and extension module according to various embodiments.

[0008] FIG. **2** is a front view diagram of case architecture including an electronic device coupled with a device specific case according to various embodiments.

[0009] FIG. **3**A is an isometric diagram of a universal power source module according to various embodiments.

[0010] FIG. **3**B is a bottom view diagram of a universal power source module according to various embodiments.

[0011] FIG. **3**C is a top view diagram of a universal power source module according to various embodiments.

[0012] FIG. **3**D is a side view diagram of a universal power source module according to various embodiments.

[0013] FIG. **3**E is a front view diagram of a universal power source module according to various embodiments.

[0014] FIG. **3**F is a rear view diagram of a universal power source module according to various embodiments.

[0015] FIG. **4**A is an isometric diagram of a universal power source module without a front and rear cover according to various embodiments.

[0016] FIG. **4**B is a bottom view diagram of a universal power source module without a front and rear cover according to various embodiments.

[0017] FIG. **4**C is a top view diagram of a universal power source module without a front and rear cover according to various embodiments.

[0018] FIG. **4**D is a side view diagram of a universal power source module without a front and rear cover according to various embodiments.

[0019] FIG. **4**E is a front view diagram of a universal power source module without a front and rear cover according to various embodiments.

[0020] FIG. **4**F is a rear view diagram of a universal power source module without a front and rear cover according to various embodiments.

[0021] FIG. **5**A is a side view diagram of a universal power source module including a memory interface module according to various embodiments.

[0022] FIG. **5**B is a side view diagram of a universal power source module including a magnetic card reader module according to various embodiments.

[0023] FIG. **5**C is a rear view diagram of a universal power source module including a solar energy module according to various embodiments.

[0024] FIG. **5**D is a rear view diagram of a universal power source module including an inductive charger module according to various embodiments.

[0025] FIG. **6** is a flow diagram illustrating methods according to various embodiments.

DETAILED DESCRIPTION

[0026] FIG. **1**A is an isometric diagram of a device specific power case system **110** including a universal power source module **100** and extension module **200** according to various embodiments. As shown in FIG. **1**A, the device specific power case **110** includes universal power source module **100** and extension module **200**. In an embodiment, the power case system **110** is shaped and sized to encase at least a portion of a specific electronic device (**130**, FIG. **2**). In an embodiment the electronic device may be a cellular phone. The specific electronic device **130** shown in FIG. **2** may be a cellular phone have a screen **132** and various device elements (camera, microphone, headset jack, energy communication devices (infrared, near field communication (NFC)) that require an openings **202**A, **202**B, **202**C, **202**D, **13** to enable the device specific element to communicate signals without impeding desired performance.

[0027] In an embodiment, the universal power source module (UPSM) **110** may provide off grid electrical energy to an electronic device **130** coupled to the system **110** via an interface **52**B (FIG. **1**B) and be capable of using energy from outside source to charge an internal electrical energy storage module **40** and provide energy to the coupled electronic device **130** via an interface **52**B (FIG. **1**B). The UPSM **110** may be sized to not interfere with most if not all device specific elements for a variety of similar electronic devices currently on the market and distributed in the future. Most similar electronic devices have a minimal footprint and include few or no device specific communication elements on their rear or back section. The UPSM **100** may be sized to be located on the rear portion of most electronic devices while not interfering or blocking device specific elements that may not function properly when blocked.

[0028] Electronic device shape, size, and electronic elements, number and location may change with each iteration of the device or introduction of new model or provider/manufacturer. Such electronic device **130** modifications may require the overall case **110** dimensions and device specific element openings **202**A to be changed. In an embodiment, the UPSM **100** dimensions may remain constant and the molded phone case extension module **200** may be modified to support different electronic devices and their device specific elements. In an embodiment, the molded phone case extension module **200** may be formed from one or more moldable materials including silicon, thermoplastic polyurethane

(TPU), elastomers, polymers, carbon fibers, fiberglass, sintered metals or other formable materials.

[0029] FIG. **1**B is a bottom view diagram of a device specific case system **110** including a universal power source module **100** and extension module **200** according to various embodiments. As shown in FIG. **1**B, the extension module **200** may include one or more device specific openings **202**D, **202**E. In an embodiment, the UPSM **100** may include a power and status button **56** on the rear panel **60** (FIG. **1**E). The power and status button **56** may enable a case user to activate the backup power source to provide power to a coupled electronic device **130** and determine external power status and electrical energy storage element **40** charge level or status.

[0030] FIG. **1**C is a top view diagram of a device specific case system **110** including a universal power source module (UPSM) **110** and extension module **200** according to various embodiments. As shown in FIG. **1**C, the extension module **200** may further include additional device specific openings **202**B, **202**C, and **202**A. In an embodiment, the openings may correspond to a device headset jack or port, infrared transmitter, and camera with flash for the electronic device **130**. In an embodiment, the electronic device may be a Samsung® cellular phone model Galaxy S4®. As noted the extension module **200** may be configured or changed to at least partially encase a mobile electronic device and enable access to various device specific elements.

[0031] FIG. **1**D is a side view diagram of a device specific case system **110** including a universal power source module **100** and extension module **200** according to various embodiments. As shown in FIG. **1**D, the extension module **200** may include a deformable button **204**A to engage a device specific element such a power button or volume control. The UPSM **100** may include an external power and data connector (EPDC) **52**A and the extension module **200** may include an opening **202**G for the external power and data connector **52**A. In an embodiment the connector **52**A may be a power only connector or a data and power connector. In an embodiment the connector **52**A may be a universal serial bus (USB) female connector including micro-USB or mini-USB. As shown in FIG. **4**A the EPDC **52**A may be coupled to a control module **50**. The control module **50** may also be coupled to an internal power and data connector (IPDC) **52**B and an electrical energy storage element (EESE) **40**. In an embodiment, the EESE **40** may be any device capable of storing and discharging electrical energy including a capacitor or battery. The EESE **40** may also be universal and usable by various electronic devices. In an embodiment the EESE **40** may be a under writers (UL) and Cellular Telecommunications and Internet Association (CTIA) (IEEE 1725) certified battery having a storage capacity from 800 mAh (milli-Ampere-Hours) to 3000 mAh and 1500 mAh to 2100 mAh.

[0032] In an embodiment the EPDC **52**A may be a micro USB type A or B device and include five contacts. The EPDC **52**A may receive a DC powered signal on the power contacts having a voltage level of about 4.45 to 5.25 volts (5 volts nominally) and current from about 100 mA to 900 mA. The EPDC **52**A may also communicate data via the data pins. In an embodiment, the control module **50** may monitor power and data signals received on the EPDC **52**A. When the received power level is sufficient and an electronic device **130** is coupled to the control module **50** via the IPDC **52**B, the control module may provide power signals to the electronic device **130**. The control module **50** may also use a power signal received on the EPDC **52**A to charge or maintain a charge level in the EESE **40**. The control module **50** may prioritize power delivery to the coupled electronic device **130** versus the EESE **40** when a power signal is present on the EPDC **52**A. In an embodiment, the control module **50** may also receive a power signal or electrical energy from a solar panel (**58**A FIG. **5**C) located on the UPSM **100**C rear cover or section **60**A (FIG. **5**C). The control module **50** may use power received from the solar panel **58**B to provide a power signal to the electronic device **130** (when coupled to the control module **50** via the IPDC **52**B) and to charge or maintain the EESE **40**.

[0033] When the power signal received from the EPDC **52**A and solar panel **58**B is not sufficient for a coupled electronic device **130**, the control module **50** may direct energy from the EESE **40** to the coupled electronic device **130**. In an embodiment, the control module **50** may include a printed circuit board **51** (FIG. **4**A). The PCB **51** may include a central processor or application specific integrated circuit (ASIC) **54**A and electrical connections to the EESE **40**, the EPDC **52**A, the IPDC **52**B, the solar panel **58**B, the inductive charger module **58**A (FIG. **5**D), the memory interface module (MIM) **52**C (FIG. **5**A), and the magnetic card reader module (MCRM) **52**D (FIG. **5**B). As shown in FIG. **5**D in an embodiment, a UPSM **100**D may include an inductive charging module **58**A that enables a user to provide energy inductively to the electronic device case system **110** when the inductive charging module **58**A is located within a required proximity to a inductive energy source.

[0034] As shown in FIG. **5**A, a UPSM **100**A may also include a MIM **52**C. The MIM **52**C may interface with one or more memory devices including a compact flash card, secure digital (SD), miniSD, microSD, SD high capacity (SDHC), miniSDHC, microSDHC, SD extended capacity, and memory stick. The MIM **52**C may conform to the SD input-output (SDIO) standard to enable a data memory card and other devices to communicate electronic data with via a coupled electronic device **130**. In an embodiment, the ASIC **54**A may also include an internal memory module where the electronic data may be communicated with a coupled electronic device **130** and IPDC **52**B and another electronic device via the EDPC **52**A.

[0035] As shown in FIG. **5**B, a UPSM **100**B may also include a magnetic card reader module (MCRM) **52**D. The MCRM **52**D may be able to read magnetic information stored on magnetic strip of a card. The control module **50** may communicate the magnetic card stored information with a coupled electronic device **130** via the IPDC **52**B. The electronic device **130** may be provided with or include an application that enables the electronic device **130** to communicate data signals with the control module **50** including data signals from the EPDC **52**A, MIM **52**C, MCRM **52**D and ASIC **54**A internal memory module. As noted, the control module **50** may communicate data between the electronic device **130** and the EPDC **52**A via the IPDC **52**B. In an embodiment, the control module **50** may support USB 1.0, 2.0, and 3.0 and the data rate communicated by the control module **50** may vary from 1.5 Mbits to 5.0 Gbits depending on the devices coupled to the EPDC **52**A and IPDC **52**B.

[0036] FIG. **1**E is a front view diagram of a device specific case system **110** including a UPSM **100** and coupled extension module **200** according to various embodiments. As shown in FIG. **1**E, the UPSM **100** may be located in the lower, middle section of the system **110** where the system **110** is shaped and sized to be coupled to the rear of a handheld

portable electronic device **130**. It is noted that a portable, handheld, electronic device is less likely to device specific elements on their bottom rear section that become inoperable when placed adjacent a user's hand or the UPSM **100**. As noted, some electronic devices **130** may intentionally include a device specific element on the bottom rear section for security reasons, requiring a user to consciously hold the device **130** in precise manner to employ or active such a located device specific element. In an embodiment the electronic device **130** includes a communication module on the bottom rear, such as an NFC module. In such an embodiment, the UPSM **100** may include portal or fenestration **13** to be located over the device specific element so the element will function when the electronic device **130** is coupled to the electronic device case system **110**.

[0037] The extension module **200** is coupled to the UPSM **100** and together form a case that includes opening for device specific elements, electrical connector located to be operatively engage a device power-data interface and the rear section of the portable, handheld, electronic device **130**. As shown in FIG. **1**E, the extension module **200** may include an opening **202**A on upper rear section that may coincide with a device **130** specific element (camera and flash for a specific device). The UPSM **100** may include the fenestration **13** and IPDC **52**B where the IPDC **52**B is located at the bottom rear section to engage a mating connector for a specific device. As shown in **4**A, the IPDC **52**B is coupled to the PCB **51** via a cable **53**. The IPDC **52**B may be moved to other locations to correspond the specific device mating connector location (such as on the right side, left side, bottom left, bottom right, and bottom middle.) As shown in FIGS. **3**A-**4**F, the UPSM **100** may include a rigid frame **30**, a front cover **10**, and a rear cover **60**.

[0038] The front cover **10** may be coupled to the rear cover **60** via one or more retaining elements **12**A passing through retaining element fenestrations **34**A. In another embodiment, one of the front cover **10** and the rear cover **60** may be integrally formed with the frame **30**. The covers **10**, **60**, and frame **30** may be formed of more rigid materials than the extension module **200** in an embodiment. In an embodiment, the covers **10**, **60**, and frame **30** may be formed of similar materials as the extension module **200**. In a further embodiment, a cover **10**, **60** may be formed of a different material than the frame **30**. In an embodiment the frame may be formed from polymers, metals, alloys, and other at least semi-rigid materials. The covers **10**, **60** may be formed or polymers, metals, alloys, elastomers, TPU, silicon, or other materials that may or not be semi-rigid. As shown in FIGS. **3**A-**4**F, the frame **30** may include multiple notches **32**A to **32**C that configured to securely couple the extension module to the frame **30**. In another embodiment the frame **30** may glued or electronically seamed to the extension module as a function of their respective materials.

[0039] To create or design a new case system **110** for a specific device **130**, a user may employ the algorithm **140** shown in FIG. **6**. As shown in FIG. **6**, a new specific device **130** may be measured for a case (activity **142**). Then the size differential between the UPSM **100** and the new case to be formed for the specific device, where the differential may represent the sizing and shape for the extension module **200** may be determined (activity **144**). When the specific device **130** has an element that may not function properly and must be located behind the UPSM **100**, a fenestration **13** may be created in the UPSM (activities **146**, **148**). Then, based on the specific device measurements and the differential from the UPSM **100**, an extension module **200** may be created (activity **152**). Thereafter the extension module **200** may be securely coupled to the UPSM **100** to form the device specific case system **110**. In an embodiment, the algorithm **140** may also locate or determine the position of the IPDC **52**B based on the location of the corresponding interface in the specific device **130**.

[0040] FIG. **3**A is an isometric diagram of a universal power source module **100** according to various embodiments. FIG. **3**B is a bottom view diagram of a universal power source module **100** according to various embodiments. FIG. **3**C is a top view diagram of a universal power source module **100** according to various embodiments. FIG. **3**D is a side view diagram of a universal power source module **100** according to various embodiments. FIG. **3**E is a front view diagram of a universal power source module **100** according to various embodiments. FIG. **3**F is a rear view diagram of a universal power source module **100** according to various embodiments. As shown in FIGS. **3**A-**3**F, the EPDC **52**A may located on the right bottom corner in an embodiment and the IPDC **52**B may be located in the extension module **200** to mate with the specific device interface. In an embodiment, the IPDC **52**B may be a micro-usb interface and the specific device **130** may mating micro-USB interface. As shown in FIGS. **3**A-**3**F, the UPSM **100** frame **30** may include multiple notches **32**A to **32**D. The extension module **200** may be configured to include mating, reciprocal notches to enable the extension module **200** to securely engage the UPSM **100**. As shown in FIG. **3**F, the UPSM **100** may include a power button **56**. In an embodiment the button **56** may also include multiple display elements. The elements may display different colors and intensity where the numbers of elements active, color, and intensity may indicate the EESE **40** charge status, external power status at interface EPDC **52**A, and specific device status at interface IPDC **52**B.

[0041] FIG. **4**A is an isometric diagram of a universal power source module **100** without a front **10** and rear cover **60** according to various embodiments. FIG. **4**B is a bottom view diagram of a universal power source module **100** without a front **10** and rear cover **60** according to various embodiments. FIG. **4**C is a top view diagram of a universal power source module **100** without a front **10** and rear cover **60** according to various embodiments. FIG. **4**D is a side view diagram of a universal power source module **100** without a front **10** and rear cover **60** according to various embodiments. FIG. **4**E is a front view diagram of a universal power source module **100** without a front **10** and rear cover **60** according to various embodiments. FIG. **4**F is a rear view diagram of a universal power source module **100** without a front **10** and rear cover **60** according to various embodiments. As shown in FIGS. **4**A to **4**F, the EESE **40** size (length, width, and depth) may be selected based on the desired energy storage capacity. The frame **30** dimensions may correspond to the EESE **40** dimensions, any needed device specific fenestrations **13**, the control module **50** minimal dimensions, and the EPDC **52**A dimensions. In an embodiment, the front and rear covers **10**, **60** may be coupled to the frame via locking elements **12**A including bolts or screws. In another embodiment, the front and rear covers **10**, **60** may be coupled to the frame **30** via notches, glue, welds, or other securing devices.

[0042] The rear cover **60**, **60**A, **60**B may include an opening for the fenestration **13** and button **56**. In an embodiment, the UPSM **100**D may include one or more light emitting

diodes **59**A, **59**B, **59**C as shown in FIG. **5**D. The LEDs **59**A, **59**B, **59**C may be mounted directly to the PCB **51** of the control module **50** (FIG. **4**F). The rear cover **60**B may include openings for fenestrations for the LEDs **59**A-C. In an embodiment, there may be one or more LEDs **59**A-C or an LED in the button **56**. In an embodiment, there may be a single LED **59**A that changes color, display rate, and intensity depending on the EESE **40** or the coupled device **130** charge status. In an embodiment, the LED may emit a green wavelength signal when the EESE **40** or device **130** is about 80 to 100% charged, a blue wavelength signal when the EESE **40** or device **130** is about 30 to 80%, and red wavelength signal when the EESE **40** or device **130** is less than 30% charged, and may blink red when the EESE **40** or device **130** is unable to hold a charge.

[0043] In an embodiment the control module **50** may start charging a coupled device **130** via the IPDC **52**B when the power button **56** is held for a first predetermined time internal and discontinue charging the device when the button **56** is held for a second predetermined time internal. The first and second time intervals may be from 1 to 5 seconds or about 2 seconds in an embodiment. The control module **50** may stop charging a coupled device **130** via the IPDC **52**B when its load is below a predetermined amperage for a predetermined time interval. In an embodiment, the predetermined amperage may be less from 100 mA to 10 mA and the time internal may be from 1 to 15 minutes or less than 60 mA for 10 minutes in an embodiment.

[0044] The modules described herein may include hardware circuitry, single or multi-processor circuits, memory circuits, software program modules and objects, firmware, and combinations thereof, as desired and as appropriate for particular implementations of various embodiments. The apparatus and systems of various embodiments may be useful in applications. They are not intended to serve as a complete description of all the elements and features of apparatus and systems that might make use of the structures described herein. It is noted that the case system **110** may be sized for larger electronic devices including tablets and the EESE **40** may be sized and have a larger capacity accordingly.

[0045] Applications that may include the novel apparatus and systems of various embodiments include electronic circuitry used in high-speed computers, communication and signal processing circuitry, modems, single or multi-processor modules, single or multiple embedded processors, data switches, and application-specific modules, including multilayer, multi-chip modules. Such apparatus and systems may further be included as sub-components within a variety of electronic systems, such as televisions, cellular telephones, personal computers (e.g., laptop computers, desktop computers, handheld computers, tablet computers, etc.), workstations, radios, video players, audio players (e.g., mp3 players), vehicles, medical devices (e.g., heart monitor, blood pressure monitor, etc.) and others. Some embodiments may include a number of methods.

[0046] It may be possible to execute the activities described herein in an order other than the order described. Various activities described with respect to the methods identified herein can be executed in repetitive, serial, or parallel fashion. A software program may be launched from a computer-readable medium in a computer-based system to execute functions defined in the software program. Various programming languages may be employed to create software programs designed to implement and perform the methods disclosed herein. The programs may be structured in an object-orientated format using an object-oriented language such as Java or C++. Alternatively, the programs may be structured in a procedure-orientated format using a procedural language, such as assembly or C. The software components may communicate using a number of mechanisms well known to those skilled in the art, such as application program interfaces or inter-process communication techniques, including remote procedure calls. The teachings of various embodiments are not limited to any particular programming language or environment.

[0047] The accompanying drawings that form a part hereof show, by way of illustration and not of limitation, specific embodiments in which the subject matter may be practiced. The embodiments illustrated are described in sufficient detail to enable those skilled in the art to practice the teachings disclosed herein. Other embodiments may be utilized and derived therefrom, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. This Detailed Description, therefore, is not to be taken in a limiting sense, and the scope of various embodiments is defined only by the appended claims, along with the full range of equivalents to which such claims are entitled.

[0048] Such embodiments of the inventive subject matter may be referred to herein individually or collectively by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any single invention or inventive concept, if more than one is in fact disclosed. Thus, although specific embodiments have been illustrated and described herein, any arrangement calculated to achieve the same purpose may be substituted for the specific embodiments shown. This disclosure is intended to cover any and all adaptations or variations of various embodiments. Combinations of the above embodiments, and other embodiments not specifically described herein, will be apparent to those of skill in the art upon reviewing the above description.

[0049] The Abstract of the Disclosure is provided to comply with 37 C.F.R. §1.72(b), requiring an abstract that will allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In the foregoing Detailed Description, various features are grouped together in a single embodiment for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted to require more features than are expressly recited in each claim. Rather, inventive subject matter may be found in less than all features of a single disclosed embodiment. Thus the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separate embodiment.

1. A portable handheld mobile device (PHMD) apparatus for providing power and device perimeter protection for a PHMD, the apparatus including:

a power source module (PSM), the power source module including:

a PSM frame, the frame including an outer perimeter smaller than the smallest outer, rear perimeter of a plurality of PHMD, at least two of the PHMD having different outer, rear perimeter sizes, each PHMD including a power coupling interface;

an electrical energy storage module (EESM), the EESM storing and discharging electrical energy and sized to fit with the PSM frame;

an input electrical energy interface (WEI) configured to couple to an electrical energy power source;

an output electrical energy interface (OEEI) configured to provide electrical energy to one of the plurality of PHMD power coupling interface; and

a control module sized to fit substantially within the PSM frame and providing electrical energy to the OEEI from one of the EESM and the EESM; and

a molded extension module, the molded extension module including:

a fenestration sized and shaped to securely couple to the PSM frame perimeter; and

a perimeter sized and shaped to engage at least 60 percent of the one of the plurality of PHMD perimeter.

2. The PHMD apparatus of claim **1**, wherein the molded extension module perimeter includes a section sized and shaped to engage at least 60 percent of the one of the plurality of PHMD perimeter.

3. The PHMD apparatus of claim **1**, wherein the control module includes a printed circuit board sized to substantially fit within the PSM frame.

4. The PHMD apparatus of claim **1**, the one of the plurality of PHMD perimeter including four sides and wherein the molded extension module perimeter includes a section sized and shaped to securely engage at least three of four sides of the one of the plurality of PHMD perimeter.

5. The PHMD apparatus of claim **1**, the one of the plurality of PHMD perimeter including four sides and wherein the molded extension module perimeter includes a section sized and shaped to securely engage the four sides of the one of the plurality of PHMD perimeter.

6. The PHMD apparatus of claim **5**, wherein the molded extension module perimeter section sized and shaped to engage the four sides of the one of the plurality of PHMD perimeter is at least partially deformable.

7. The PHMD apparatus of claim **1**, wherein the plurality of PHMD are similar use devices.

8. The PHMD apparatus of claim **1**, wherein the plurality of PHMD are mobile phones.

9. The PHMD apparatus of claim **1**, wherein the OEEI is a standardized electrical connector.

10. The PHMD apparatus of claim **9**, wherein the WEI is a standardized electrical connector.

11. The PHMD apparatus of claim **1**, wherein the OEEI provides electrical energy inductively.

12. The PHMD apparatus of claim **9**, wherein the WEI receives electrical energy inductively.

13. The PHMD apparatus of claim **1**, wherein the PSM frame includes a notch on at least two sides and the molded extension module fenestration includes matching protrusions to engage the PSM frame notches.

14. The PHMD apparatus of claim **1**, wherein the PSM frame includes a notch on four sides and the molded extension module fenestration includes matching protrusions to engage the PSM frame notches.

15. The PHMD apparatus of claim **14**, wherein the molded extension module is formed of at least partially flexible material.

16. The PHMD apparatus of claim **14**, wherein the molded extension module is formed of at least partially flexible material and the PSM frame is formed of substantially rigid material.

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