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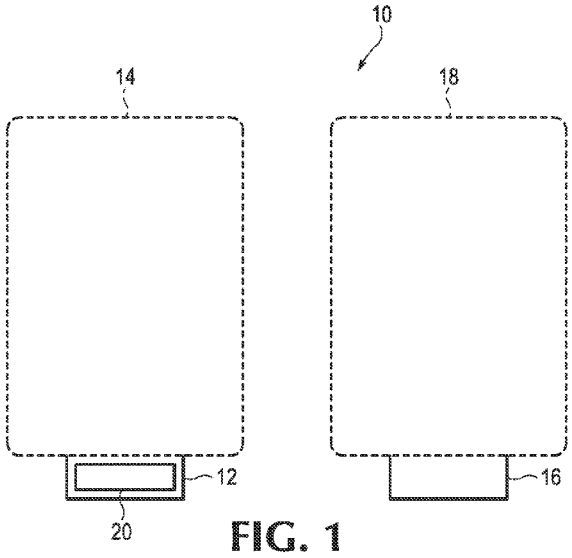


FIG. 1

(57) Abstract: An interconnect assembly is disclosed herein. An example includes a wireless connector to wirelessly transceive data to and from a first device and a connector to transceive data to and from a second device. The interconnect assembly additionally includes an interface selector to establish a communications protocol to exchange the data between the first device and the second device.

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INTERCONNECT ASSEMBLY

BACKGROUND

[0001] Consumers appreciate ease of use and reliability in their devices. They also appreciate aesthetically pleasing designs. Businesses may, therefore, endeavor to create and provide devices directed toward one or more of these objectives.

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] The following detailed description references the drawings, wherein:

[0003] FIG. 1 is an example of an interconnect assembly.

[0004] FIG. 2 is an example of a group of protocol formats for use by an interface selector of the interconnect assembly of FIG. 1.

[0005] FIG. 3 is an example of a security module for use by the interconnect assembly of FIG. 1.

[0006] FIG. 4 is an example of a keying mechanism of an interface selector of the interconnect assembly of FIG. 1.

[0007] FIG. 5 is an example of an implementation of the keying mechanism of FIG. 4.

[0008] FIG. 6 is an example of an implementation of the interface selector of the interconnect assembly of FIG. 1.

[0009] FIG. 7 is another example of an implementation of the interface selector of the interconnect assembly of FIG. 1.

[0010] FIG. 8 is an additional example of an implementation of the interface selector of the interconnect assembly of FIG. 1.

[0011] FIG. 9 is a further example of an implementation of the interface selector of the interconnect assembly of FIG. 1.

[0012] FIG. 10 is a still further example of an implementation of the interface selector of the interconnect assembly of FIG. 1.

[0013] FIG. 11 is an example of the use of a cable with the interconnect assembly of FIG. 1.

[0014] FIG. 12 is an example of the use of a second cable with the interconnect assembly of FIG. 11.

DETAILED DESCRIPTION

[0015] Interconnect assemblies may include various mechanical components or elements, such as prongs, plugs, pins, or clips, which matingly engage a corresponding socket, aperture, opening or receptacle during connection. Examples of such interconnect assemblies include various cable assemblies (e.g., Universal Serial Bus, Video Graphics Array, High Definition Multimedia Interface, IEEE 1394, etc.) for use with devices, such as computers, tablets, mobile phones, televisions, and personal digital assistants.

[0016] The mechanical parts of these interconnect assemblies can be subject to damage and/or fatigue which can compromise the integrity of a connection. Additionally, dirt, debris, moisture, and other contaminants may collect on or enter such interconnect assemblies and their corresponding sockets, apertures, openings or receptacles which can render them, and/or any

devices to which they are connected, inoperable. Furthermore, such interconnect assemblies and their corresponding sockets, apertures, openings and receptacles may detract from the aesthetics of a device for at least some consumers.

[0017] In some instances, it may be desirable to connect a device with other devices that do not necessarily utilize the same communications protocol. Allowing an end user of a device to easily accomplish this task would add to the versatility of such a device. In still other instances, it may be desirable to restrict which other devices a device may connect to by limiting the types of protocols this device may utilize to transceive data with other devices.

[0018] An example of an interconnect assembly 10 that is directed to addressing these objectives is illustrated in FIG. 1. As used herein, the term "cable" is defined as including, but is not necessarily limited to, either (i) one or more wires or cables that transceive data in the form of signals and that may be covered or bound together by a sleeve, insulation, conduit, tape, one or more straps, etc. or (ii) a dongle.

[0019] As used herein, the term "dongle" is defined as including, but is not necessarily limited to, an apparatus that provides additional or enhanced functionality (e.g., additional memory, wireless connectivity, etc.) or an apparatus that facilitates the interface or connection between two different types of adapters, protocols, or power sources. Examples of dongles include, but are not limited to, flash memories, secure keys, and connection adapters.

[0020] As used herein, the term "transceive" is defined as including both transmission and reception of data in the form of one or more signals. As used herein, the terms "wireless" and "wirelessly" are defined as including, but are not necessarily limited to, a connection or coupling that does not require mechanical components or elements such as prongs, plugs, pins, or clips

that matingly engage a corresponding socket, aperture, opening or receptacle. Wireless connections and couplings may operate in any of a variety of different frequency ranges and wavelengths. They may also be established electrically, magnetically, or optically.

[0021] As used herein, the term "communications protocol" is defined as including, but is not necessarily limited to, a format, syntax, and signaling arrangement utilized to transceive data to and from devices. Examples of various communications protocols include, but are not limited to, hypertext transfer protocol (HTTP), file transfer protocol (FTP), universal serial bus (USB) packet identifier (PID) bytes, IEEE 802.11, high-definition multimedia interface (HDMI), etc.

[0022] As used herein, the term "user interface" is defined as including, but not necessarily limited to, any graphical, textual and/or auditory medium that permits communications protocols to be viewed, sorted, searched and/or selected via use of one or more input devices such as a keyboard, mouse, touch screen, or microphone. As used herein, the term "device" is defined as including, but is not necessarily limited to, a computer, tablet, mobile phone, television, personal digital assistant, monitor, display, audio component, peripheral, dock, sleeve, docking station, or appliance.

[0023] As used herein, the terms "near field communication" and "NFC" are defined as including, but are not necessarily limited to, a technology for devices to establish communication with each other by touching them together or bringing them into close proximity (e.g., a distance of approximately four (4) centimeters (cm) or less). This communication can be encrypted or unencrypted. This communication may also be established over radio frequencies (e.g., 13.56 megahertz (MHz) on an ISO/IEC 18000-3 air interface) and at varying data rates (e.g., 106 Kbits/sec. to 424 Kbits/sec.). Near field communication devices can engage in two-way

communication with one another, as well as one-way communication with near field communication data tags. Portions of near field communication technology have been approved as standards (e.g., ISO/IEC 18092/ECMA-340 and ISO/IEC 21481/ECMA-352).

[0024] As used herein, the terms "near field communication data tag" and "NFC data tag" are defined as including, but are not necessarily limited to, a near field communication device that contains or stores one or more scripts and/or data. These scripts and/or data may be read-only or rewriteable. As used herein, the terms 'near field communication reader" and "NFC reader" are defined as including, but are not necessarily limited to, a device that reads or decodes information on an NFC data tag.

[0025] Referring again to FIG. 1, interconnect assembly 10 includes a wireless connector 12 to wirelessly transceive data to and from a first device 14. Interconnect assembly 10 also includes a connector 16 to transceive data to and from a second device 18 and an interface selector 20 to establish a communication protocol to exchange data between first device 14 and second device 18.

[0026] An example of a group of different communications protocol formats 22 for use by interface selector 20 of interconnect assembly 10 is shown in FIG. 2. As can be seen in FIG. 2, interface selector 20 chooses one of the communications protocol formats from group 22, as generally indicated by arrow 24, to establish the communications protocol via wireless connector 12 and connector 16, as generally indicated by arrow 26, between first device 14 and second device 18, as generally indicated by double-headed arrow 28. In some cases, group of different communications protocol formats 22 may include a first set of data communications protocol formats and a second set of video communications protocol formats. In other cases, group of

different communications protocol formats 22 may include other sets or different sets of communications protocol formats (e.g., audio communications protocol formats).

[0027] An example of a security module 30 for use by interconnect assembly 10 is shown in FIG. 3. Security module 30 is utilized to control which of the different communications protocol formats in group 22 that interface selector 20 may choose, as generally indicated by arrow 32, to establish the communications protocol between first device 14 and second device 18. This control or filtering performed by security module 30 is generally indicated by arrow 34. Security module 30 may be utilized to restrict the types of connections that first device 14 may establish. For example, security module 30 may be utilized to restrict first device 14 from accessing the internet by blocking the various types of protocols utilized for such data exchange, such as hypertext transfer protocol (HTTP) or hypertext transfer protocol secure (HTTPS). Additionally or alternatively, security module 30 may be utilized to restrict the types of devices to which first device 14 may establish a connection. For example, security module 30 may be utilized to restrict first device 14 from accessing video devices by blocking the various types of protocols utilized for data exchange by such devices, such as those protocols associated with high-definition multimedia interface (HDMI) or digital visual interface (DVI).

[0028] Connector 16 may also be wireless to wirelessly transceive data to and from second device 18. In some examples, wireless connectors 12 and 16 of interconnect assembly 10 may operate in the extremely high frequency (EHF) range. In other examples, wireless connectors 12 and 16 of interconnect assembly 10 may operate substantially at sixty (60) gigahertz (GHz). In still other examples, wireless connectors 12 and 16 of interconnect assembly 10 may operate substantially in an infrared frequency range. This use of such wireless technology for connectors

12 and 16 helps to eliminate the issues, described above, associated with interconnect assemblies that utilize mechanical components.

[0029] An example of a keying mechanism 36 of interface selector 20 of interconnect assembly 10 is shown in FIG. 4. Keying mechanism 36 automatically chooses the communication protocol between first device 14 and second device 18 which provides the benefits of time savings and convenience to the end-user of first device 14. Keying mechanism 36 may be located in wireless connector 12, first device 14, connector 16, and/or second device 18.

[0030] An example of an implementation of keying mechanism 36 is shown in FIG. 5. As can be seen in FIG. 5, keying mechanism 36 includes a predetermined arrangement of magnets 38 and 40 in wireless connector 12 as well as magnets 42 and 44 in first device 14. Magnets 38, 40, 42, and 44 of keying mechanism 36 also help to attach and align wireless connector 12 to first device 14. Although a pair of magnets 38 and 40 in wireless connector 12 and a pair of magnets 42 and 44 in first device 14 are shown in the example of FIG. 5, it is to be understood that a different number and/or arrangement of magnets may be used in other examples. For instance, a single magnet could be used in wireless connector 12 along with a single magnet in first device 14. As another example, more than two magnets may be used in wireless connector 12 and/or first device 14. As a further example, a pair of magnets in connector 16 and a pair of magnets in second device 18 may be used instead.

[0031] An example of an implementation of interface selector 20 of interconnect assembly 10 is shown in FIG. 6. As can be seen in FIG. 6, in this example, interface selector 20 includes a user interface 46 in first device 14 to manually choose the communication protocol between first device 14 and second device 18. In this example, an end-user of first device 14 is presented with

a menu or pop-up of three different communication protocols to choose from, the selection of which may depend on the characteristics of second device 18. Although not shown in FIG. 6, it is to be understood that in other examples of interface selector 20, user interface 46 may be alternatively or additionally located in second device 18. Allowing an end-user this range of choices via user interface 46 of interconnect assembly 10 adds versatility and provides for the possibility of adding different or additional protocols to support other types of existing or future-developed devices and technology.

[0032] Another example of an implementation of interface selector 20 of interconnect assembly 10 is shown in FIG. 7. As can be seen in FIG. 7, in this example, interface selector 20 includes a switch assembly 48 to manually choose the communications protocol between first device 14 and second device 18. An end-user of device 14 sets or positions switch assembly 48 to select one of the protocols from group of communications protocol formats 22, as generally indicated by arrow 50. Although not shown in FIG. 7, it is to be understood that in other examples of interface selector 20, switch assembly 48 may be alternatively or additionally located in connector 16. Allowing an end-user this range of choices via switch assembly 48 of interconnect assembly 10 adds versatility.

[0033] An additional example of an implementation of interface selector 20 of interconnect assembly 10 is shown in FIG. 8. As can be seen in FIG. 8, in this example, interface selector 20 includes a near field communication (NFC) data tag 52 in wireless connector 12 and a near field communication (NFC) reader 54 in first device 14 that ascertains the communications protocol to be utilized based on information stored on NFC data tag 52, as generally indicated by arrow 56. NFC reader 54 then selects the ascertained communication protocol from group of communications protocol formats 22, as generally indicated by arrow 58. Although not shown in

FIG. 8, it is to be understood that in other examples of interface selector 20, NFC data tag 52 may alternatively be located in connector 16 and NFC reader 54 may alternatively be located in second device 18. Use of NFC data tag 52 provides versatility to interface selector 20 of interconnect assembly 10 by providing for the possibility of adding different or additional protocols (through an update to NFC data tag 52) to support other types of existing or future developed devices and technology.

[0034] A further example of an implementation of interface selector 20 of interconnect assembly 10 is shown in FIG. 9. As can be seen in FIG. 9, in this example, interface selector 20 includes an optical emitter 60 in wireless connector 12 and an optical detector 62 in first device 14 to create an optical coupling, as generally indicated by arrow 64. A communication protocol is then selected from group of communications protocol formats 22 based on this optical coupling, as generally indicated by arrow 58. Although not shown in FIG. 9, it is to be understood that in other examples of interface selector 20, optical emitter 60 may alternatively be located in connector 16 and optical detector 62 may alternatively be located in second device 18.

[0035] A still further example of an implementation of interface selector 20 of interconnect assembly 10 is shown in FIG. 10. As can be seen in FIG. 10, in this example, interface selector 20 includes either a first inductive member 66 or a first capacitive member 68 in wireless connector 12 and either a corresponding second inductive member 70 or a second capacitive member 72 in first device 14 to create either an inductive coupling or a capacitive coupling, as generally indicated by double-headed arrow 74. A communication protocol is then selected from group of communications protocol formats 22 based on this inductive or capacitive coupling, as generally indicated by arrow 76. Although not shown in FIG. 10, it is to be understood that in other examples of interface selector 20, first inductive member 66 or first capacitive member 68

may alternatively be located in connector 16 and second inductive member 70 or second capacitive member 72 may alternatively be located in second device 18.

[0036] An example of the use of a cable 78 with interconnect assembly 10 is shown in FIG. 11. As can be seen in FIG. 11, cable 78 includes a first end 80 to which wireless connector 12 is coupled and a second end 82 to which connector 16 is coupled. Although not shown in FIG. 11, it is to be understood that in other examples of use of cable 78 with interconnect assembly 10, second end 82 may be hard wired to second device 18. That is, second end 82 may be permanently retained or attached to second device 18 and not intended to be removed by an end-user of second device 18. This type of connection may be established in a variety of different ways such as, for example, directly soldering second end 82 to an input/output controller of second device 18 or through the use of a connector at second end 82 of cable 78 that is held captive by second device 18.

[0037] An example of the use of a second cable 84 with interconnect assembly 10 is shown in FIG. 12. As can be seen in FIG. 12, second cable 84 includes a third end 86 coupled to wireless connector 12 and a fourth end 88 at which a second connector 90 is located to transceive data to and from second device 18. In this example of interconnect assembly 10, interface selector 20 can establish a communications protocol to exchange data between first device 14 and second device 18 via either wireless connector 12, connector 16, and cable 78 or wireless connector 12, second connector 90 and second cable 84. This communications protocol established via either wireless connector 12, connector 16, and cable 78 or wireless connector 12, second connector 90 and second cable 84 can be the same or different.

[0038] Use of second cable 84 and second connector 90 allows interconnect assembly 10 to be used with a third device 92. This provides a range of possibilities for end-users such as, for example, simultaneous use of first device 14 with both second device 18 and third device 92. In such cases, multiplexing technology may be required to allow first device 14 to transceive data to and from respective second and third devices 18 and 92. If present, such multiplexing technology could be included in wireless connector 12 and/or first device 14.

[0039] Although several examples have been described and illustrated in detail, it is to be clearly understood that the same are intended by way of illustration and example only. These examples are not intended to be exhaustive or to limit the invention to the precise form or to the exemplary embodiments disclosed. Modifications and variations may well be apparent to those of ordinary skill in the art.

[0040] Additionally, reference to an element in the singular is not intended to mean one and only one, unless explicitly so stated, but rather means one or more. Moreover, no element or component is intended to be dedicated to the public regardless of whether the element or component is explicitly recited in the following claims.

CLAIMS

What is claimed is:

1. An interconnect assembly, comprising:

a wireless connector to wirelessly transceive data to and from a first device;

a connector to transceive data to and from a second device; and

an interface selector to establish a communications protocol to exchange the data between the first device and the second device.

2. The interconnect assembly of Claim 1, further comprising a group of different communications protocol formats, and wherein the interface selector chooses one of the communications protocol formats from the group to establish the communications protocol between the first device and second device.

3. The interconnect assembly of Claim 2, wherein the group of different communications protocol formats includes a first set of data communications protocol formats and a second set of video communications protocol formats.

4. The interconnect assembly of Claim 2, further comprising a security module to control which of the different communications protocol formats in the group that the interface selector may choose to establish the communications protocol between the first device and the second device.

5. The interconnect assembly of Claim 1, wherein the connector includes a second wireless connector to wirelessly transceive data to and from the second device.

6. The interconnect assembly of Claim 1, wherein the wireless connector operates in an extremely high frequency (EHF) range.

7. The interconnect assembly of Claim 1, wherein the wireless connector operates substantially at sixty (60) gigahertz (GHz).

8. The interconnect assembly of Claim 1, wherein the wireless connector operates substantially in an infrared frequency range.

9. The interconnect assembly of Claim 1, wherein the interface selector includes a keying mechanism in at least one of the wireless connector, the connector, the first device, and the second device to automatically choose the communications protocol between the first device and the second device.

10. The interconnect assembly of Claim 9, wherein the keying mechanism includes a predetermined arrangement of magnets.

11. The interconnect assembly of Claim 1, wherein the interface selector includes a user interface in one of the first device and the second device to manually choose the communications protocol between the first device and the second device.

12. The interconnect assembly of Claim 1, wherein the interface selector includes a switch assembly in at least one of the wireless connector and the connector to manually choose the communications protocol between the first device and the second device.

13. The interconnect assembly of Claim 1, wherein the interface selector includes a near field communication data tag in one of the wireless connector and the connector, and a near field communication reader in one of the first device and the second device.

14. The interconnect assembly of Claim 1, wherein the interface selector includes an optical emitter in one of the wireless connector and the connector, and an optical detector in one of the first device and the second device to create an optical coupling.

15. The interconnect assembly of Claim 1, wherein the interface selector includes a first inductive member in one of the wireless connector and the connector, and a second inductive member in one of the first device and the second device to create an inductive coupling.

16. The interconnect assembly of Claim 1, wherein the interface selector includes a first capacitive member in one of the wireless connector and the connector, and a second capacitive member in one of the first device and the second device to create a capacitive coupling.

17. The interconnect assembly of Claim 1, further comprising a cable including a first end and a second end, and wherein the wireless connector is at the first end of the cable and the connector is at the second end of the cable.

18. The interconnect assembly of Claim 17, further comprising:

a second cable including a third end coupled to the wireless connector and a fourth end; and

a second connector at the fourth end of the second cable to transceive data to and from the second device;

wherein the interface selector establishes the communications protocol to exchange the data between the first device and the second device via one of the wireless connector, connector, and cable and the wireless connector, second connector, and second cable.

19. The interconnect assembly of Claim 18, wherein the communications protocol established via the wireless connector, connector, and cable is different than the communications protocol established via the wireless connector, second connector, and second cable.

20. The interconnect assembly of Claim 17, wherein the connector at the second end of the cable is hard wired to the second device.

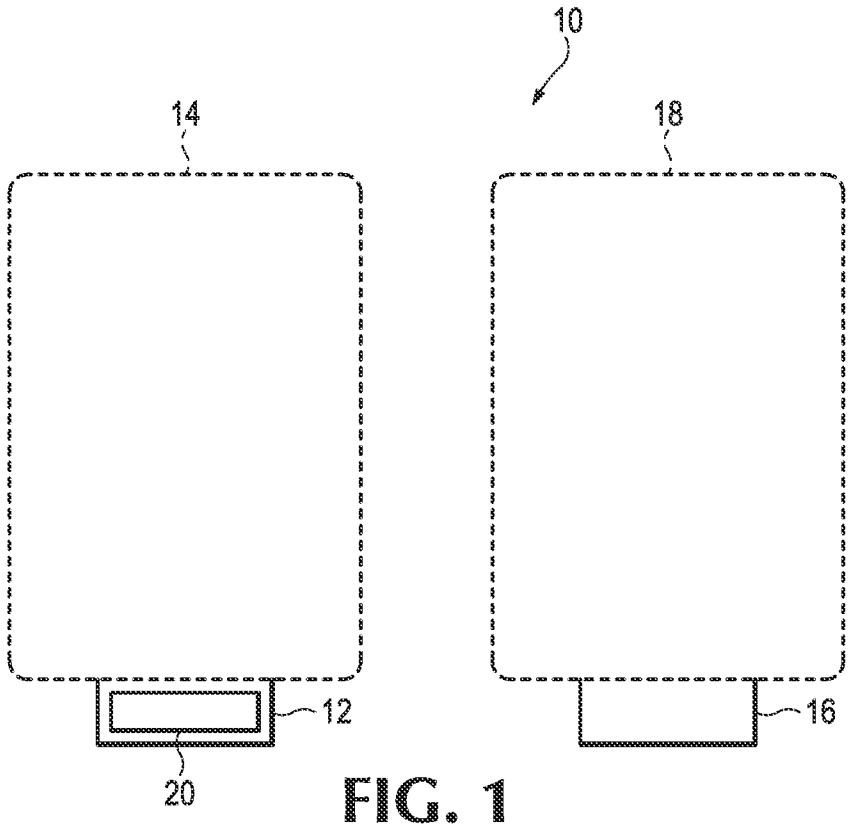


FIG. 1

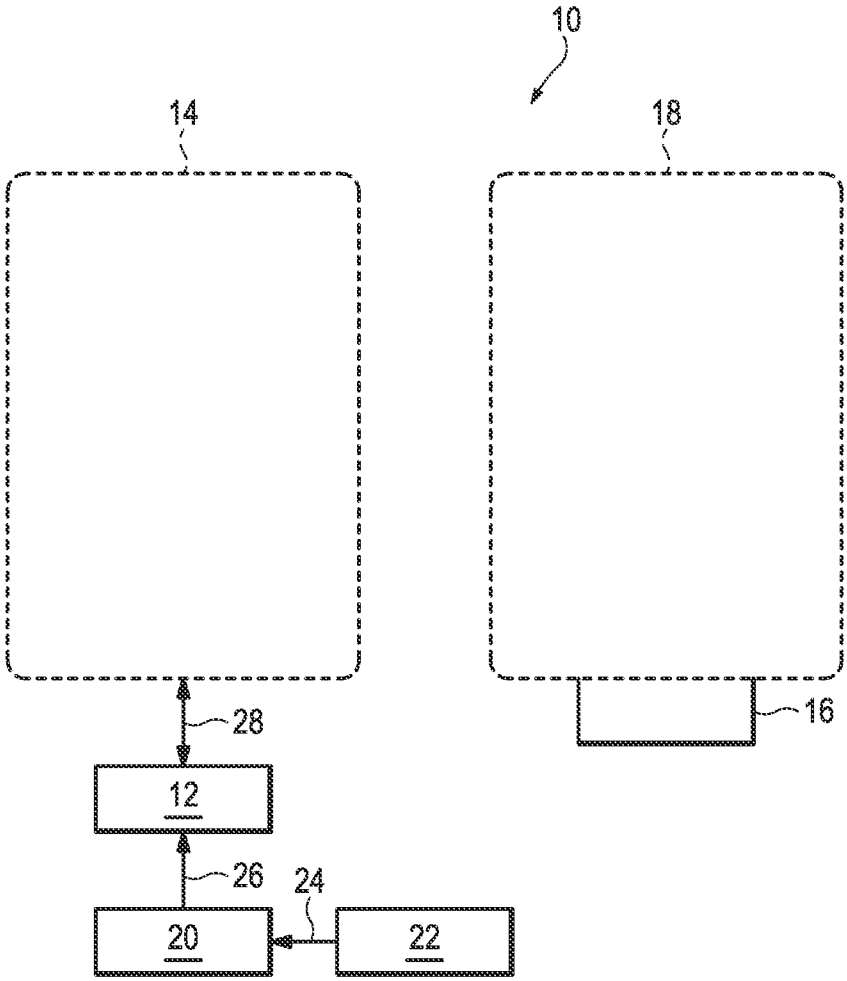


FIG. 2

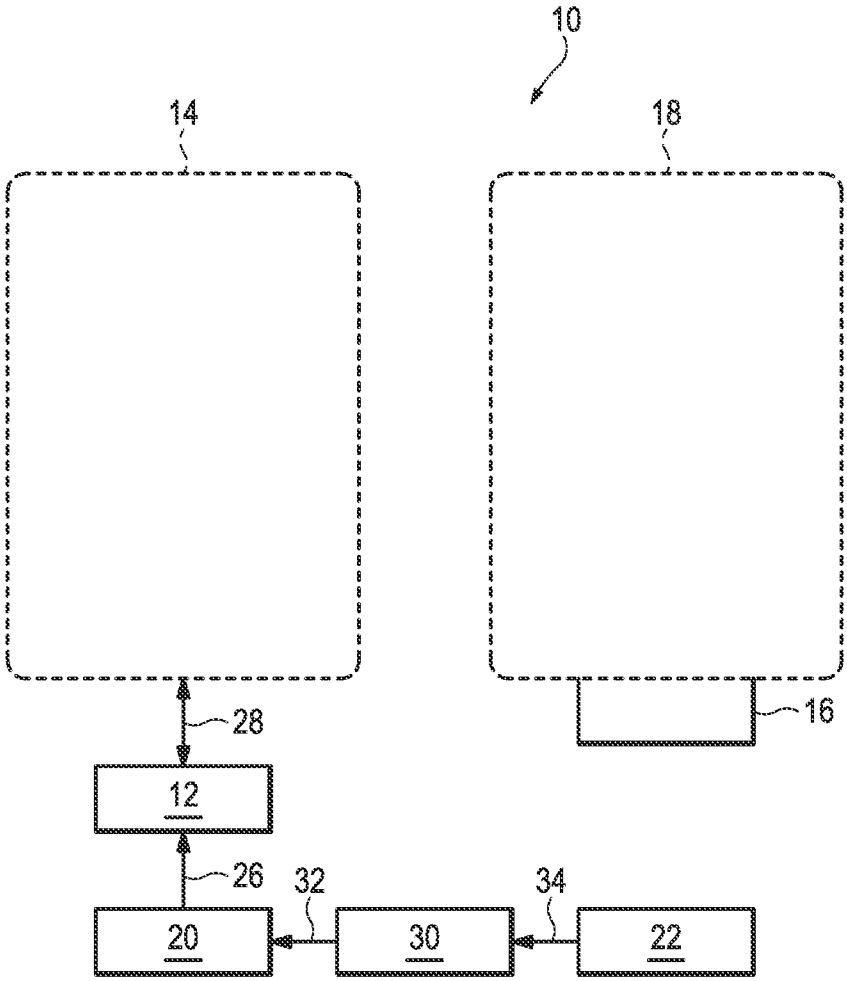


FIG. 3

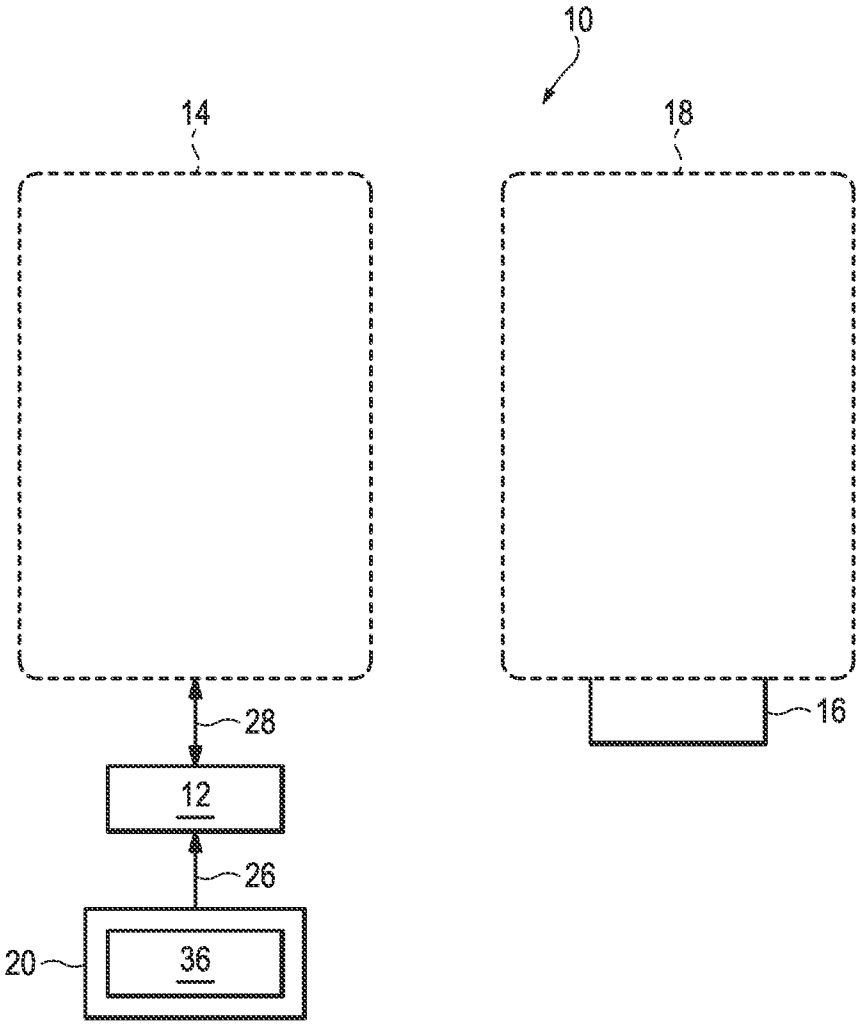


FIG. 4

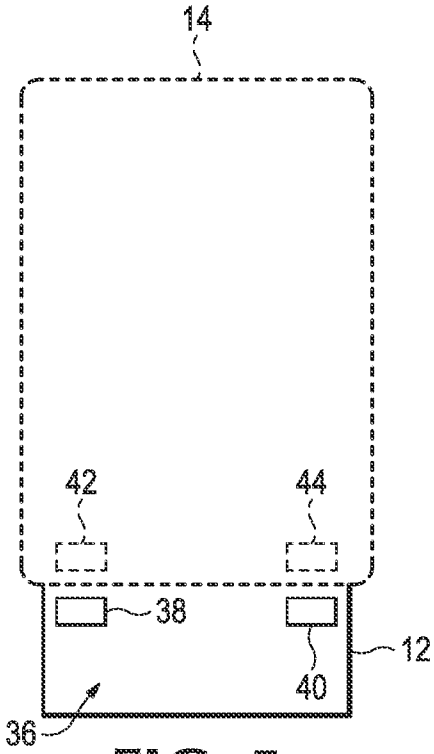


FIG. 5

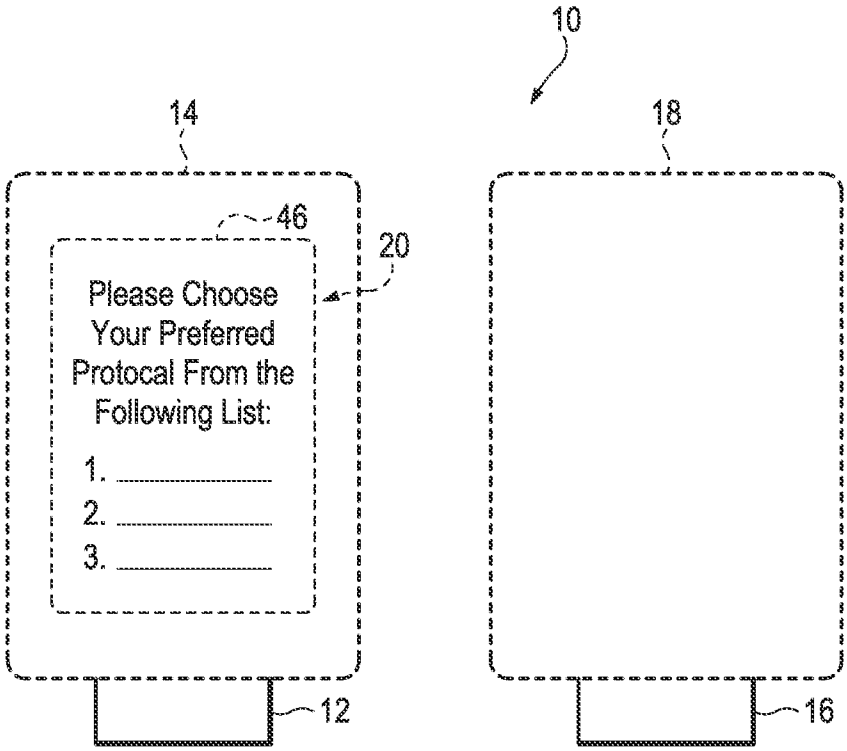

10
14
18
46
20
Please Choose Your Preferred Protocal From the Following List:
1.
2.
3.
12
16

FIG. 6

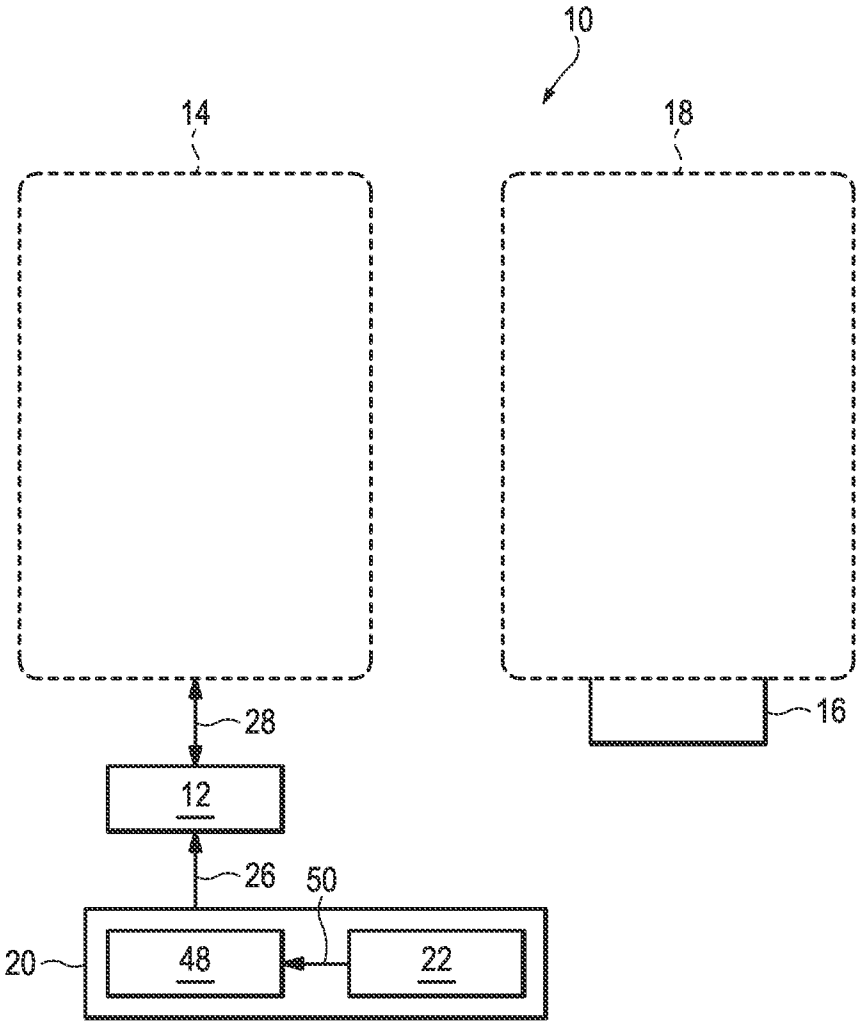


FIG. 7

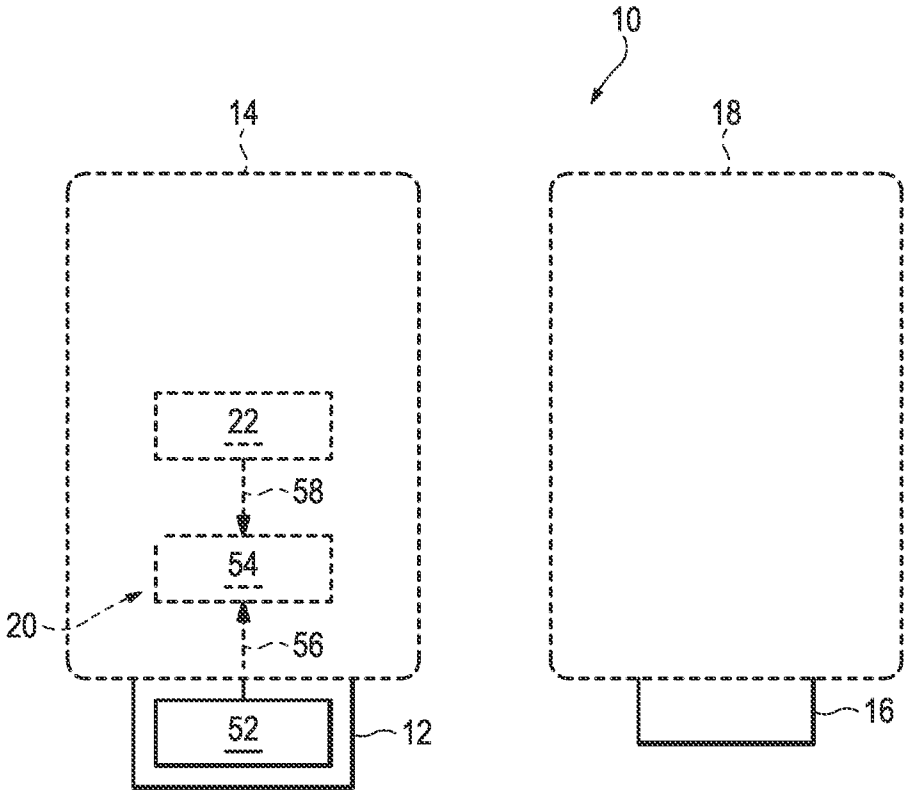


FIG. 8

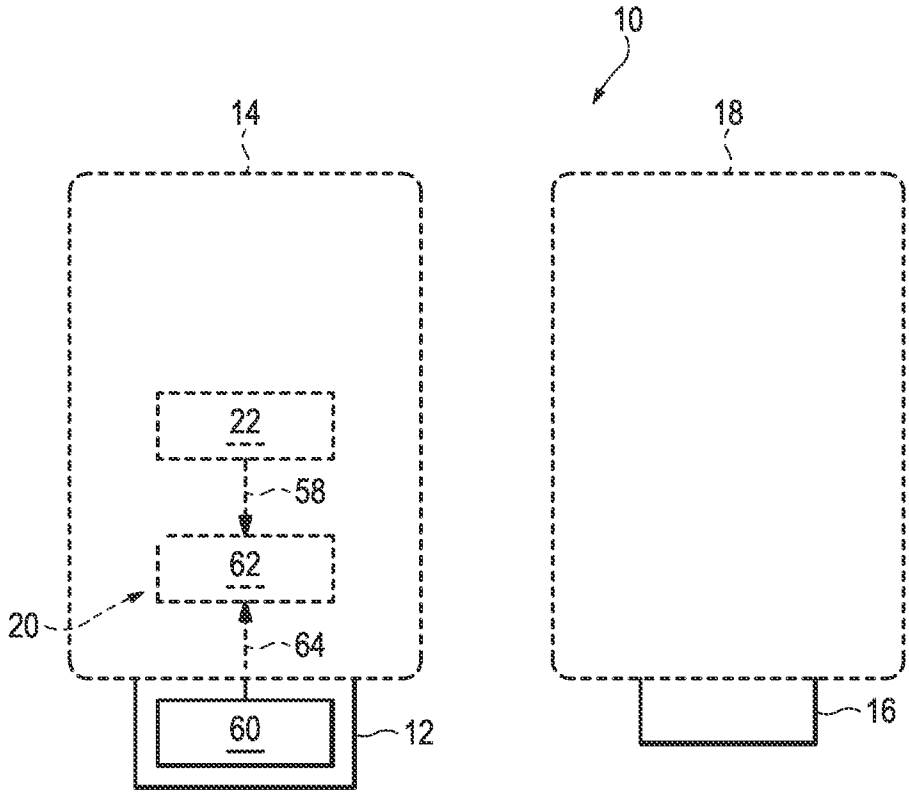


FIG. 9

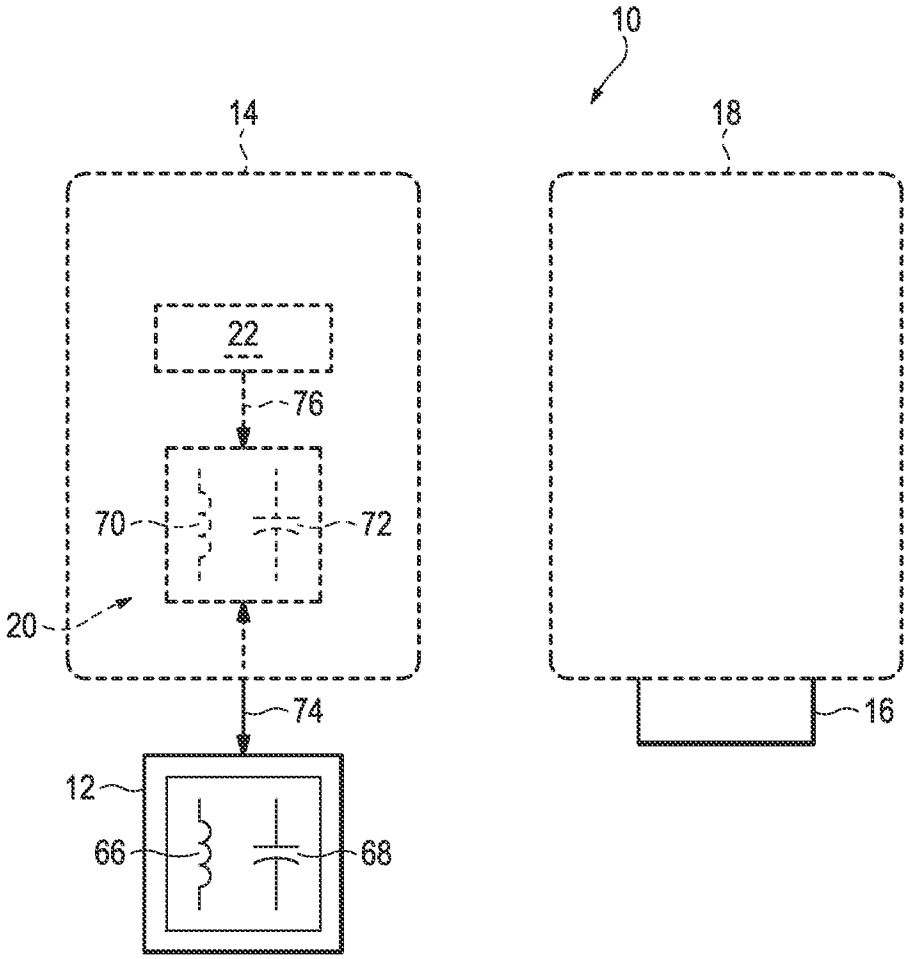


FIG. 10

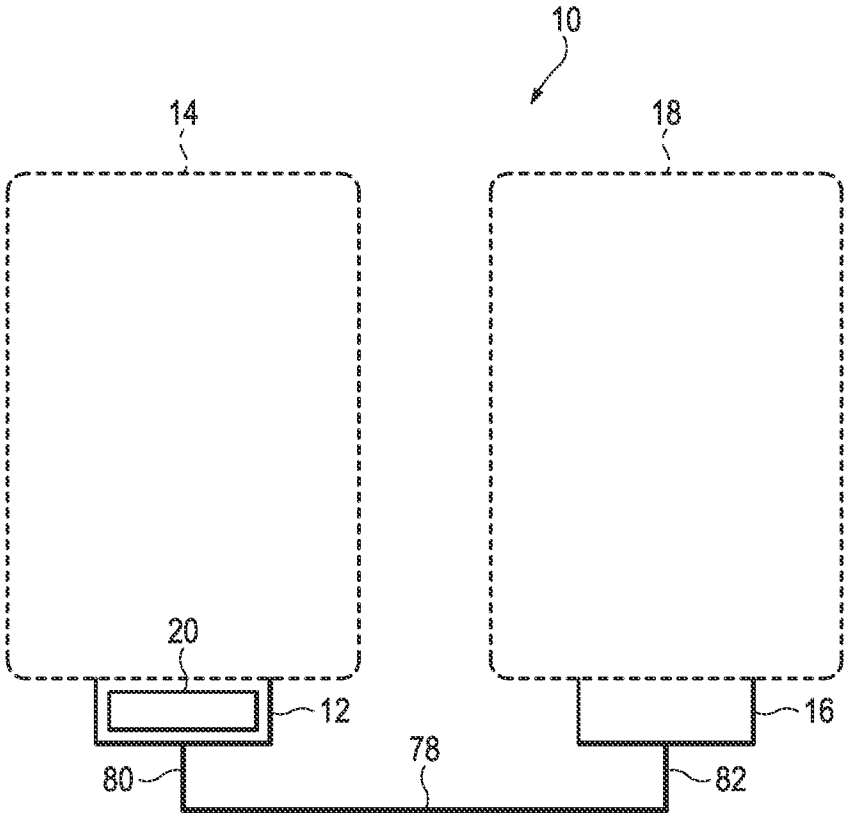


FIG. 11

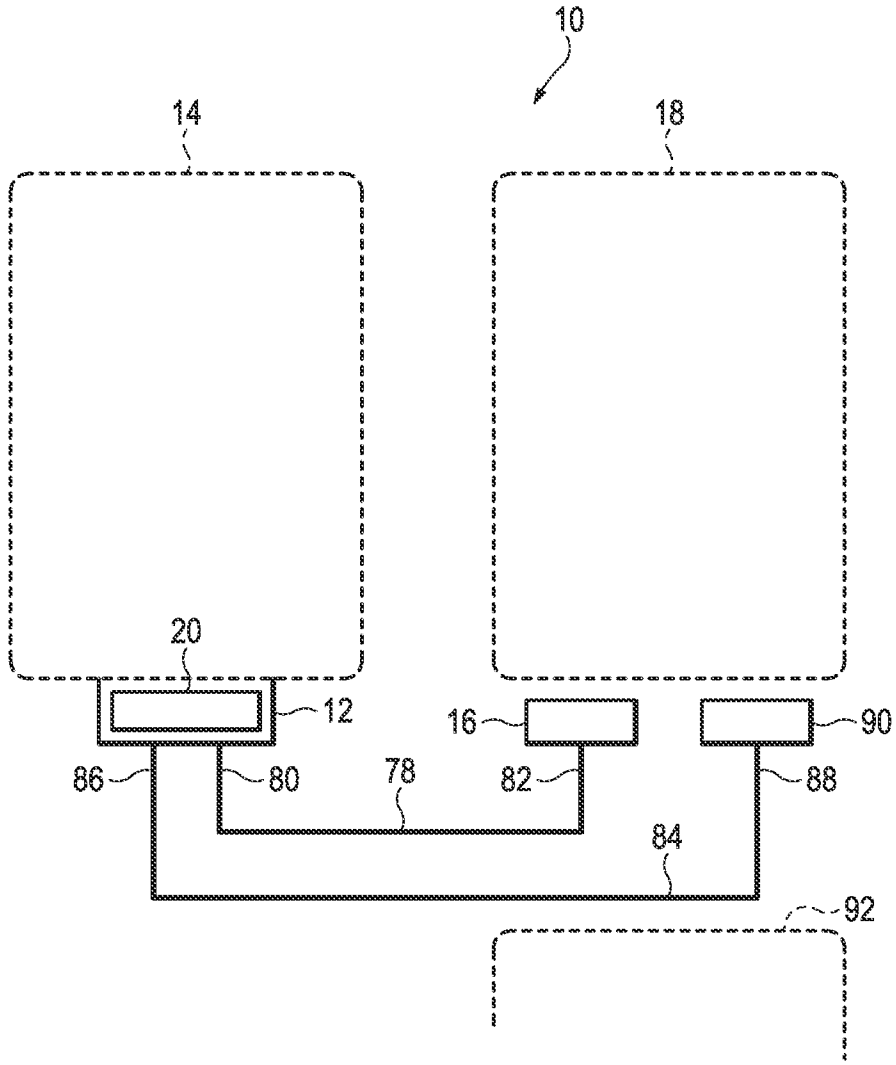


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/032882

A. CLASSIFICATION OF SUBJECT MATTER

H04L 29/06(2006.01)i, H04L 29/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04L 29/06; H04W 16/26; H04L 29/00; H04W 4/18; H04B 1/40; H04L 29/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & keywords: an interconnect assembly, wireless, connector, transceive, interface, protocol, communication, cable

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2011-0138881 A (SAMSUNG ELECTRO-MECHANICS CO., LTD.) 28 December 2011 See abstract; claims 7-9; paragraphs [0042]-[0047]; and figures 1-3.	1-20
Y	KR 10-0641228 B1 (LG ELECTRONICS, INC.) 02 November 2006 See abstract; claim 3; page 4; and figure 3.	1-20
A	WO 03-024055 A1 (INTERNATIONAL BUSINESS MACHINES CORPORATION) 20 March 2003 See abstract; claim 14; pages 10, 11; and figure 1.	1-20
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☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
26 December 2013 (26.12.2013)	**27 December 2013 (27.12.2013)**

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
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