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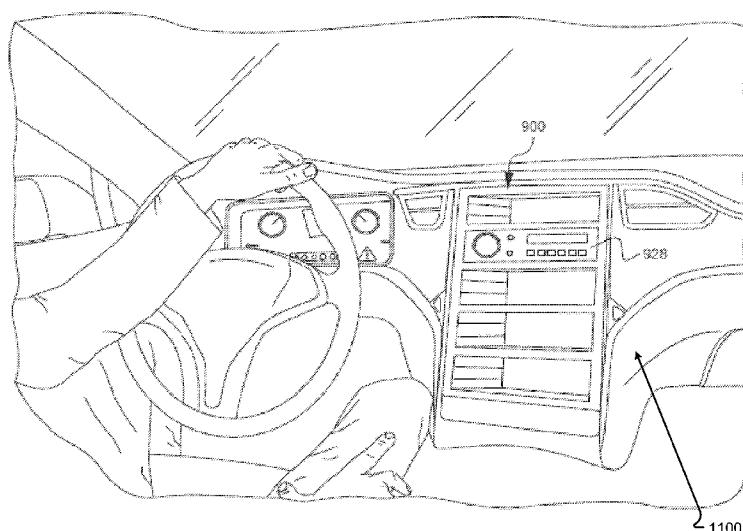


FIG. 11A

(57) Abstract: Methods and systems for a complete vehicle ecosystem are provided. Specifically, systems that when taken alone, or together, provide an individual or group of individuals with an intuitive and comfortable vehicular environment. The present disclosure includes a universal chassis that may be mounted in the head unit of a vehicle. The chassis may accept one or more modules that each have common dimensions. With a common form factor, the universal chassis is configurable as different modules with different functionality may be inserted into the chassis with ease.

CONFIGURABLE HARDWARE UNIT FOR CAR SYSTEMS**CROSS REFERENCE TO RELATED APPLICATIONS**

[0001] The present application claims the benefits of and priority, under 35 U.S.C. § 119(e), to U.S. Provisional Application Serial Nos. 61/560,509, filed on November 26, 2011, entitled “Complete Vehicle Ecosystem;” 61/637,164, filed on April 23, 2012, entitled “Complete Vehicle Ecosystem;” 61/646,747, filed on May 14, 2012, entitled “Branding of Electrically Propelled Vehicles Via the Generation of Specific Operating Sounds;” 61/653,275, filed on May 30, 2012, entitled “Vehicle Application Store for Console;” 61/653,264, filed on May 30, 2012, entitled “Control of Device Features Based on Vehicle State;” 61/653,563, filed on May 31, 2012, entitled “Complete Vehicle Ecosystem;” 61/663,335, filed on June 22, 2012, entitled “Complete Vehicle Ecosystem;” 61/672,483, filed on July 17, 2012, entitled “Vehicle Climate Control;” and 61/714,016, filed on October 15, 2012, entitled “Vehicle Middleware.” The entire disclosures of the applications listed above are hereby incorporated by reference, in their entirety, for all that they teach and for all purposes.

[0002] This application is also related to U.S. Patent Application Nos. 13/420,236, filed on March 14, 2012, entitled, “Configurable Vehicle Console;” 13/420,240, filed on March 14, 2012, entitled “Removable, Configurable Vehicle Console;” 13/462,593, filed on May 2, 2012; 13/462,596, filed on May 2, 2012, entitled “Configurable Heads-Up Dash Display;” __/__, filed on November 16, 2012, entitled “Implementation of Conquest Functionality in Automotive Console” (Attorney Docket No. 6583-228); __/__, filed on November 16, 2012, entitled “Car Application Store for Console” (Attorney Docket No. 6583-230); __/__, filed on November 16, 2012, entitled “Sharing Applications/Media Between Car and Phone (Hydroid)” (Attorney Docket No. 6583-231); __/__, filed on November 16, 2012, entitled “In-Cloud Connection for Car Multimedia” (Attorney Docket No. 6583-232); __/__, filed on November 16, 2012, entitled “Music Streaming” (Attorney Docket No. 6583-233); __/__, filed on November 16, 2012, entitled “Activate/Deactivate Features of Console/Car Based on Location (State Law Compliance)” (Attorney Docket No. 6583-234); __/__, filed on November 16, 2012, entitled “Insurance Tracking” (Attorney Docket No. 6583-235); __/__, filed on November 16, 2012, entitled “Law Breaking/Behavior Sensor” (Attorney Docket No. 6583-236); __/__, filed on November 16, 2012, entitled “Etiquette Suggestion” (Attorney Docket No. 6583-237); __/__, filed on November

16, 2012, entitled "Parking Space Finder Based on Parking Meter Data" (Attorney Docket No. 6583-238); __/ __/ __, filed on November 16, 2012, entitled "Parking Meter Expired Alert" (Attorney Docket No. 6583-239); __/ __/ __, filed on November 16, 2012, entitled "Object Sensing (Pedestrian Avoidance/Accident Avoidance) " (Attorney Docket No. 6583-240); __/ __/ __, filed on November 16, 2012, entitled "Proximity Warning Relative to Other Cars" (Attorney Docket No. 6583-241); __/ __/ __, filed on November 16, 2012, entitled "Street Side Sensors" (Attorney Docket No. 6583-242); __/ __/ __, filed on November 16, 2012, entitled "Car Location" (Attorney Docket No. 6583-263); __/ __/ __, filed on November 16, 2012, entitled "Universal Bus in the Car" (Attorney Docket No. 6583-244); __/ __/ __, filed on November 16, 2012, entitled "Mobile Hot Spot/Router/Application Share site or Network" (Attorney Docket No. 6583-245); __/ __/ __, filed on November 16, 2012, entitled "Universal Console Chassis for the Car" (Attorney Docket No. 6583-246); __/ __/ __, filed on November 16, 2012, entitled "Middleware" (Attorney Docket No. 6583-247); __/ __/ __, filed on November 16, 2012, entitled "Real Time Traffic" (Attorney Docket No. 6583-248); __/ __/ __, filed on November 16, 2012, entitled "Map Updating" (Attorney Docket No. 6583-249); __/ __/ __, filed on November 16, 2012, entitled "Indications Call Mechanic" (Attorney Docket No. 6583-250); __/ __/ __, filed on November 16, 2012, entitled "Felon Identifier" (Attorney Docket No. 6583-251); __/ __/ __, filed on November 16, 2012, entitled "Behavioral Tracking and Vehicle Applications" (Attorney Docket No. 6583-252); __/ __/ __, filed on November 16, 2012, entitled "Improvements to Controller Area Network Bus" (Attorney Docket No. 6583-314); __/ __/ __, filed on November 16, 2012, entitled "Location Information Exchange Between Vehicle and Device" (Attorney Docket No. 6583-315); __/ __/ __, filed on November 16, 2012, entitled "In Car Communication Between Devices" (Attorney Docket No. 6583-316); __/ __/ __, filed on November 16, 2012, entitled "Configurable Hardware Unit for Car Systems" (Attorney Docket No. 6583-317); __/ __/ __, filed on November 16, 2012, entitled "Feature Recognition for Configuring a Vehicle Console and Associated Devices" (Attorney Docket No. 6583-318); __/ __/ __, filed on November 16, 2012, entitled "Configurable Vehicle Console" (Attorney Docket No. 6583-412); __/ __/ __, filed on November 16, 2012, entitled "Configurable Dash Display" (Attorney Docket No. 6583-413); __/ __/ __, filed on November 16, 2012, entitled "Configurable Heads-Up Dash Display" (Attorney Docket No. 6583-414); and __/ __/ __, filed on November 16, 2012, entitled "Removable, Configurable Vehicle Console" (Attorney Docket No. 6583-415). The entire disclosures

of the applications listed above are hereby incorporated by reference, in their entirety, for all that they teach and for all purposes.

BACKGROUND

[0003] Whether using private, commercial, or public transport, the movement of people and/or cargo has become a major industry. In today's interconnected world daily travel is essential to engaging in commerce. Commuting to and from work can account for a large portion of a traveler's day. As a result, vehicle manufacturers have begun to focus on making this commute, and other journeys, more enjoyable and easier.

[0004] Currently, vehicle manufacturers attempt to entice travelers to use a specific conveyance based on any number of features. Most of these features focus on vehicle safety or efficiency. From the addition of safety-restraints, air-bags, and warning systems to more efficient engines, motors, and designs, the vehicle industry has worked to appease the supposed needs of the traveler. Recently, however, vehicle manufactures have shifted their focus to user and passenger comfort as a primary concern. Making an individual more comfortable while traveling instills confidence and pleasure in using a given vehicle and increases an individual's preference for a given manufacturer and/or vehicle type.

[0005] One way to instill comfort in a vehicle is to create an environment within the vehicle similar to that of an individual's home. Integrating features in a vehicle that are associated with comfort found in an individual's home can ease a traveler's transition from home to vehicle. Several manufacturers have added comfort features in vehicles such as the following: leather seats, adaptive and/or personal climate control systems, music and media players, ergonomic controls, Internet connectivity, etc. However, because these manufacturers have added features to a conveyance, they have built comfort around a vehicle and failed to build a vehicle around comfort. Thus, the vehicle as an ecosystem has not been fully considered.

SUMMARY

[0006] There is a need for a vehicle ecosystem that can integrate both physical and mental comforts while seamlessly operating with current electronic devices to result in a totally intuitive and immersive user experience. These and other needs are addressed by the various aspects, embodiments, and/or configurations of the present disclosure. Also, while the disclosure is presented in terms of exemplary embodiments, it should be appreciated that individual aspects of the disclosure can be separately claimed.

[0007] The present disclosure can provide a number of advantages depending on the particular aspect, embodiment, and/or configuration. Currently, the vehicle industry is

dominated by conveyances offering a separate comfort experience from a home, work, or other aspect of a traveler's life. Unfortunately, current vehicles include a series of separate devices that work together while an individual or individuals are associated with the vehicle. Technology areas and devices such as user interfaces, applications, tracking capabilities, hardware, and/or location-based communications, could be combined together, or used separately, to form a complete vehicle ecosystem. This ecosystem can provide a connected and intuitive user experience for any traveler.

[0008] A series of devices associated with a vehicle along with other devices can form a complete and familiar user experience. In particular, the devices, applications, interfaces, hardware, and software may combine to form a user-friendly environment while traveling or otherwise moving from one location to another and/or when a vehicle is at rest.

Moreover, aspects of the present disclosure may provide communication between the vehicle and a user at any given time. Specifically, communication between a vehicle and another device may also relay information to an individual and/or group of individuals. This communication between a vehicle and at least one other device may include, but is not limited to, communication between a vehicle and: 1) at least one mobile device, 2) at least one other vehicle, 3) another system/group of devices, 4) a non-mobile device, and 5) combinations thereof. These and other advantages will be apparent from the disclosure.

[0009] The present disclosure describes a method executed by a vehicle system. The vehicle system can automatically determine a person is within a vehicle; automatically identify the person; determine if there is a setting to be stored for the person; and store the setting.

[0010] The term "ecosystem" or "vehicle ecosystem," as used herein, refers to a community of person(s) in conjunction with the vehicle or other device components of their environment (for example, climate control, safety features, mobile devices, multimedia sources etc.), interacting as a system.

[0011] The term "environment" or "vehicle environment," as used herein, refers to the surroundings or conditions in which a person operates a vehicle.

[0012] The term "sensor," as used herein, refers to a converter or instrument that measures a physical quantity or quality and converts the measurement into a signal which can be read, observed, stored, and/or understood by an observer or by another instrument.

[0013] The term "stimulus," as used herein, refers to some event or something external that influences an activity.

[0014] The term “vehicle console” and variations thereof, as used herein, generally refers to, in an automobile, the control-bearing surfaces in the center of the front of the vehicle interior. The term is applied to the area beginning in the dashboard and continuing beneath it, and often merging with the transmission tunnel which runs between the front driver's and passenger's seats of many vehicles.

[0015] The term “automotive navigation system” is a satellite navigation system designed for use in automobiles. It typically uses a GPS navigation device to acquire position data to locate the user on a road in the unit's map database. Using the road database, the unit can give directions to other locations along roads also in its database. Dead reckoning using distance data from sensors attached to the drivetrain, a gyroscope and an accelerometer can be used for greater reliability, as GPS signal loss and/or multipath can occur due to urban canyons or tunnels.

[0016] The term “bus” and variations thereof, as used herein, refers to a subsystem that transfers information and/or data between various components. A bus generally refers to the collection communication hardware interface, interconnects, bus architecture, and/or protocol defining the communication scheme for a communication system and/or communication network. A bus may also be specifically refer to a part of a communication hardware that interfaces the communication hardware with the interconnects that connect to other components of the corresponding communication network. The bus may be for a wired network, such as a physical bus, or wireless network, such as part of an antenna or hardware that couples the communication hardware with the antenna. A bus architecture supports a defined format in which information and/or data is arranged when sent and received through a communication network. A protocol may define the format and rules of communication of a bus architecture.

[0017] The terms “communication device,” “smartphone,” and “mobile device,” and variations thereof, as used herein, are used interchangeably and include any type of device capable of communicating with one or more of another device and/or across a communications network, via a communications protocol, and the like. Exemplary communication devices may include but are not limited to smartphones, handheld computers, laptops, netbooks, notebook computers, subnotebooks, tablet computers, scanners, portable gaming devices, phones, pagers, GPS modules, portable music players, and other Internet-enabled and/or network-connected devices.

[0018] The terms “head unit,” “dash,” “dashboard,” and variations thereof, as used herein, are used interchangeably and include any panel and/or area of a vehicle disposed

adjacent to an operator, user, and/or passenger. Typical dashboards may include but are not limited to one or more control panel, instrument housing, head unit, indicator, gauge, meter, light, audio equipment, computer, screen, display, HUD unit, and graphical user interface.

[0019] The term “electronic address” refers to any contactable address, including a telephone number, instant message handle, e-mail address, Universal Resource Locator (“URL”), Universal Resource Identifier (“URI”), Address of Record (“AOR”), electronic alias in a database, like addresses, and combinations thereof.

[0020] The term “head unit” and variations thereof, as used herein, refers to a component of a stereo system either in a vehicle or home cinema system which provides a unified hardware interface for the various components of an electronic media system.

[0021] The term “communication system” or “communication network” and variations thereof, as used herein, refers to a collection of communication components capable of one or more of transmission, relay, interconnect, control, or otherwise manipulate information or data from at least one transmitter to at least one receiver. As such, the communication may include a range of systems supporting point-to-point to broadcasting of the information or data. A communication system may refer to the collection individual communication hardware as well as the interconnects associated with and connecting the individual communication hardware. Communication hardware may refer to dedicated communication hardware or may refer a processor coupled with a communication means (*i.e.* an antenna) and running software capable of using the communication means to send a signal within the communication system. Interconnect refers some type of wired or wireless communication link that connects various components, such as communication hardware, within a communication system. A communication network may refer to a specific setup of a communication system with the collection of individual communication hardware and interconnects having some definable network topography. A communication network may include wired and/or wireless network having a pre-set to an ad hoc network structure.

[0022] The phrases “at least one”, “one or more”, and “and/or” are open-ended expressions that are both conjunctive and disjunctive in operation. For example, each of the expressions “at least one of A, B and C”, “at least one of A, B, or C”, “one or more of A, B, and C”, “one or more of A, B, or C” and “A, B, and/or C” means A alone, B alone, C alone, A and B together, A and C together, B and C together, or A, B and C together.

[0023] The term “a” or “an” entity,” as used herein, refers to one or more of that entity. As such, the terms “a” (or “an”), “one or more” and “at least one” can be used interchangeably herein. It is also to be noted that the terms “comprising”, “including”, and “having” can be used interchangeably.

[0024] The term “automatic” and variations thereof, as used herein, refers to any process or operation done without material human input when the process or operation is performed. However, a process or operation can be automatic, even though performance of the process or operation uses material or immaterial human input, if the input is received before performance of the process or operation. Human input is deemed to be material if such input influences how the process or operation will be performed. Human input that consents to the performance of the process or operation is not deemed to be “material”.

[0025] The term “computer-readable medium,” as used herein, refers to any tangible storage and/or transmission medium that participate in providing instructions to a processor for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, NVRAM, or magnetic or optical disks. Volatile media includes dynamic memory, such as main memory. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, magneto-optical medium, a CD-ROM, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a RAM, a PROM, and EPROM, a FLASH-EPROM, a solid state medium like a memory card, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read. A digital file attachment to e-mail or other self-contained information archive or set of archives is considered a distribution medium equivalent to a tangible storage medium. When the computer-readable media is configured as a database, it is to be understood that the database may be any type of database, such as relational, hierarchical, object-oriented, and/or the like. Accordingly, the disclosure is considered to include a tangible storage medium or distribution medium and prior art-recognized equivalents and successor media, in which the software implementations of the present disclosure are stored.

[0026] The term “desktop,” as used herein, refers to a metaphor used to portray systems. A desktop is generally considered a “surface” that typically includes pictures, called icons, widgets, folders, etc. that can activate show applications, windows, cabinets, files, folders,

documents, and other graphical items. The icons are generally selectable to initiate a task through user interface interaction to allow a user to execute applications or conduct other operations.

[0027] The term “display,” as used herein, refers to a portion of a screen used to display the output of a computer to a user.

[0028] The term “displayed image,” as used herein, refers to an image produced on the display. A typical displayed image is a window or desktop. The displayed image may occupy all or a portion of the display.

[0029] The term “display orientation,” as used herein, refers to the way in which a rectangular display is oriented by a user for viewing. The two most common types of display orientation are portrait and landscape. In landscape mode, the display is oriented such that the width of the display is greater than the height of the display (such as a 4:3 ratio, which is 4 units wide and 3 units tall, or a 16:9 ratio, which is 16 units wide and 9 units tall). Stated differently, the longer dimension of the display is oriented substantially horizontal in landscape mode while the shorter dimension of the display is oriented substantially vertical. In the portrait mode, by contrast, the display is oriented such that the width of the display is less than the height of the display. Stated differently, the shorter dimension of the display is oriented substantially horizontal in the portrait mode while the longer dimension of the display is oriented substantially vertical. The multi-screen display can have one composite display that encompasses all the screens. The composite display can have different display characteristics based on the various orientations of the device.

[0030] The term “gesture,” as used herein, refers to a user action that expresses an intended idea, action, meaning, result, and/or outcome. The user action can include manipulating a device (e.g., opening or closing a device, changing a device orientation, moving a trackball or wheel, etc.), movement of a body part in relation to the device, movement of an implement or tool in relation to the device, audio inputs, etc. A gesture may be made on a device (such as on the screen) or with the device to interact with the device.

[0031] The term “module,” as used herein, refers to any known or later developed hardware, software, firmware, artificial intelligence, fuzzy logic, or combination of hardware and software that is capable of performing the functionality associated with that element.

[0032] The term “gesture recognition” or “gesture capture,” as used herein, refers to a sense or otherwise a detection of an instance and/or type of user gesture. The gesture capture can occur in one or more areas of the screen, A gesture region can be on the display, where it may be referred to as a touch sensitive display or off the display where it may be referred to as a gesture capture area.

[0033] A “multi-screen application,” as used herein, refers to an application that is capable of producing one or more windows that may simultaneously occupy multiple screens. A multi-screen application commonly can operate in single-screen mode in which one or more windows of the application are displayed only on one screen or in multi-screen mode in which one or more windows are displayed simultaneously on multiple screens.

[0034] A “single-screen application,” as used herein, refers to an application that is capable of producing one or more windows that may occupy only a single screen at a time.

[0035] The term “screen,” “touch screen,” or “touchscreen,” as used herein, refers to a physical structure that enables the user to interact with the computer by touching areas on the screen and provides information to a user through a display. The touch screen may sense user contact in a number of different ways, such as by a change in an electrical parameter (e.g., resistance or capacitance), acoustic wave variations, infrared radiation proximity detection, light variation detection, and the like. In a resistive touch screen, for example, normally separated conductive and resistive metallic layers in the screen pass an electrical current. When a user touches the screen, the two layers make contact in the contacted location, whereby a change in electrical field is noted and the coordinates of the contacted location calculated. In a capacitive touch screen, a capacitive layer stores electrical charge, which is discharged to the user upon contact with the touch screen, causing a decrease in the charge of the capacitive layer. The decrease is measured, and the contacted location coordinates determined. In a surface acoustic wave touch screen, an acoustic wave is transmitted through the screen, and the acoustic wave is disturbed by user contact. A receiving transducer detects the user contact instance and determines the contacted location coordinates.

[0036] The term “window” refers to a, typically rectangular, displayed image on at least part of a display that contains or provides content different from the rest of the screen. The window may obscure the desktop.

[0037] The terms “determine”, “calculate” and “compute,” and variations thereof, as used herein, are used interchangeably and include any type of methodology, process, mathematical operation or technique.

[0038] It shall be understood that the term “means” as used herein shall be given its broadest possible interpretation in accordance with 35 U.S.C., Section 112, Paragraph 6. Accordingly, a claim incorporating the term “means” shall cover all structures, materials, or acts set forth herein, and all of the equivalents thereof. Further, the structures, materials or acts and the equivalents thereof shall include all those described in the summary of the invention, brief description of the drawings, detailed description, abstract, and claims themselves.

[0039] The term “vehicle” as used herein includes any conveyance, or model of a conveyance, where the conveyance was originally designed for the purpose of moving one or more tangible objects, such as people, animals, cargo, and the like. The term “vehicle” does not require that a conveyance moves or is capable of movement. Typical vehicles may include but are in no way limited to cars, trucks, motorcycles, busses, automobiles, trains, railed conveyances, boats, ships, marine conveyances, submarine conveyances, airplanes, space craft, flying machines, human-powered conveyances, and the like.

[0040] The preceding is a simplified summary of the disclosure to provide an understanding of some aspects of the disclosure. This summary is neither an extensive nor exhaustive overview of the disclosure and its various aspects, embodiments, and/or configurations. It is intended neither to identify key or critical elements of the disclosure nor to delineate the scope of the disclosure but to present selected concepts of the disclosure in a simplified form as an introduction to the more detailed description presented below. As will be appreciated, other aspects, embodiments, and/or configurations of the disclosure are possible utilizing, alone or in combination, one or more of the features set forth above or described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] Fig. 1 depicts an embodiment of a vehicle operating environment;

[0042] Fig. 2 is a block diagram of an embodiment of a vehicle system;

[0043] Fig. 3 is a block diagram of an embodiment of a vehicle interior environment separated into areas and/or zones;

[0044] Fig. 4 depicts an embodiment of a sensor configuration for a vehicle;

[0045] Fig. 5 is a block diagram of an embodiment of a vehicle control system;

[0046] Fig. 6 another block diagram of an embodiment of a vehicle control system;

[0047] Fig. 7A is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0048] Fig. 7B is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0049] Fig. 7C is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0050] Fig. 7D is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0051] Fig. 7E is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0052] Fig. 7F is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0053] Fig. 7G is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0054] Fig. 7H is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0055] Fig. 7I is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0056] Fig. 7J is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0057] Fig. 7K is a graphical representation of an embodiment of a gesture that a user may perform to provide input to a vehicle control system;

[0058] Fig. 8 is a diagram of an embodiment of a data structure for storing information about a user of a vehicle;

[0059] Fig. 9 is a flow diagram of a method for storing setting associated with a user;

[0060] Fig. 10 is a flow diagram of a method for establishing settings associated with a user;

[0061] Fig. 11 is a flow diagram of a method for storing setting associated with a user;

[0062] Fig. 12 is a flow diagram of a method for storing gestures associated with a user;

[0063] Fig. 13 is a flow diagram of a method for reacting to a gesture performed by a user;

[0064] Fig. 14 is a flow diagram of a method for storing health data associated with a user;

[0065] Fig. 15 is a flow diagram of a method for reacting to a gesture performed by a user.

[0066] In the appended figures, similar components and/or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label by a letter that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label.

DETAILED DESCRIPTION

[0067] Presented herein are embodiments of a complete vehicle ecosystem. The ecosystem can comprise single devices or a compilation of devices. This device, or these devices, may be capable of communicating with other devices and/or to an individual or group of individuals. Further, this device, or these devices, can receive user input in unique ways. The overall design and functionality of each device provides for an enhanced user experience making the device more useful and more efficient. As described herein, the device(s) may be electrical, mechanical, electro-mechanical, software-based, and/or combinations thereof.

[0068] A vehicle environment 100 that may contain a vehicle ecosystem is shown in Fig. 1. The vehicle environment 100 can contain areas associated with a vehicle or conveyance 104. The vehicle 104 is shown as a police car but can be any type of conveyance. The environment 100 can include at least three zones. A first zone 108 may be inside a vehicle 104. The zone 108 includes any interior space, trunk space, engine compartment, or other associated space within or associated with the vehicle 104. The interior environment 108 can be defined by one or more techniques, for example, geo-fencing.

[0069] A second zone 112 may be delineated by line 120. The zone 112 is created by a range of one or more sensors associated with the vehicle 104. Thus, the area 112 is exemplary of the range of those sensors and what can be detected by those sensors associated with the vehicle 104. The rest of the environment includes all space beyond the range of the sensors and is represented by 116. Thus, the environment 100 may have an area 116 that includes all areas beyond the sensor range 112. The area 116 may include future locations of travel that the vehicle 104 may proceed to in the future.

[0070] An embodiment of a vehicle system 200 is shown in Fig. 2. The vehicle system 200 may consist of hardware and/or software that conduct various operations for or with

the vehicle 104. The operations can include, but are not limited to providing information to the user, receiving input from the user, and controlling the functions or operation of the vehicle 104, etc. The vehicle system 200 can include a vehicle control system 204. The vehicle control system 204 can be any type of computing system operable to conduct the operations as described herein.

[0071] The vehicle control system 204 may interact with a memory or storage system 208 that stores system data. System data 208 may be any type of data needed for the vehicle control system 204 to control effectively the vehicle 104. An example of some of the data that may be stored by the vehicle control system 204 may be as described in conjunction with Fig. 8. The system data 208 can represent any type of database or other storage system. Thus, the system data 208 can be a flat file data system, an object-oriented data system, or some other data system that may interface with the vehicle control system 204.

[0072] The vehicle control system 204 may communicate with a device or user interface 212. The user interface 212 may be as described in conjunction with Fig. 5. The user interface 212 may be operable to receive user input either through touch input, on one or more user interface buttons, or through a graphical user interface that may include a gesture capture region, as described in conjunction with Fig. 5. Further, the symbol 212 can represent a device that is located or associated with the vehicle 104. The device 212 can be a mobile device, including, but not limited to, a mobile telephone, a mobile computer, or other type of computing system or device that is either permanently located in or temporarily associated with the automobile 104. Thus, the vehicle control system 204 can interface with the device 212 and leverage the devices computing capability to provide one or more of the features or functions as described herein.

[0073] The device or user interface 212 can receive input or provide information to a user 216. The user 216 may thus interact with the vehicle control system 204 through the interface or device 212. Further, the device 212 may include or have access to device data 220. The device data 220 can be any type of data that is used in conjunction with the device 212, including, but not limited to, multimedia data, preferences data, bioinformatics, data associated with the user 216, or other types of data. The data may be stored in a device data 220 as a storage system similar to that described in conjunction with system data 208.

[0074] The vehicle control system 204 may also communicate with or through a communication network 224. The communication network 224 can represent any type of

wireless or wired communication system that may be included within the vehicle 104 or operable to communicate outside the vehicle 104. Thus, the communication network 224 can include a local area communication capability and a wide area communication capability. For example, the communication network 224 can include a Bluetooth wireless system, an 802.11G or 802.11N wireless system, a CAN bus, an Ethernet network within the vehicle 104, or other types of communication networks that may function with or be associated with the vehicle 104. Further, the communication network 224 can also include wide area communication capabilities, including one or more of, but not limited to, a cellular communication capability, satellite telephone communication capability, a wireless wide area network communication capability, or other types of communication capabilities that allow for the vehicle control system 204 to communicate outside the vehicle 104.

[0075] The vehicle control system 204 may communicate through the communication network 224 to a server 228 that may be located in a facility that is not within physical proximity to the vehicle 104. Thus, the server 228 may represent a cloud computing system or cloud storage that allows the vehicle control system 204 to either gain access to further computing capabilities or to storage in a location outside of the vehicle 104. The server 228 can include a computer processor and memory and be similar to any computing system as understood to one skilled in the art.

[0076] Further, the server 228 may be associated with stored data 232. The stored data 232 may be stored in any system or by any method, as described in conjunction with system data 208 and/or device data 220. The stored data 232 can include information that may be associated with one or more users 216 or associated with one or more vehicles 104. The stored data 232, being stored in a cloud or in a distant facility, may be exchanged among vehicles 104 or may be used by a user 216 in different locations or with different vehicles 104.

[0077] The vehicle control system 204 may also communicate with one or more sensors 236/242, which are either associated with the vehicle 104 or communicate with the vehicle 104. Vehicle sensors 242 may include one or more sensors for providing information to the vehicle control system 204 that determine or provide information about the environment 100 in which the vehicle 104 is operating. Embodiments of these sensors may be as described in conjunction with Fig. 4. Non-vehicle sensor 236 can be any type of sensor that isn't currently associated with the vehicle 104. For example, non-vehicle sensor 236 can be sensors in a traffic system operated by a third party that provides data to

the vehicle control system 204. Further, the non-vehicle sensor 236 can be other types of sensors which provide information about the distant environment 116 or other information about the vehicle 104 or the environment 100. These non-vehicle sensors 236 may be operated by third parties but provide information to the vehicle control system 204.

Examples of information that may be used by the vehicle control system 204 may include weather tracking data, user health tracking data, vehicle maintenance data, or other types of data, which may provide environmental or other data to the vehicle control system 204.

[0078] An arrangement or configuration for sensors within a vehicle 104 is as shown in Fig. 3. The sensor arrangement 300 can include one or more areas 308 within the vehicle. An area can be a larger part of the environment inside or outside of the vehicle 104. Thus, area one 308A may include the area within the trunk space or engine space of the vehicle 104 and/or the front passenger compartment. Area three 308B may include a portion of the interior space 108 of the vehicle 104. The area N, 308N may include the trunk space or rear compartment area, when included within the vehicle 104. The interior space 108 may also be divided into areas. Thus, one area may be associated with the front passenger's and driver's seats, a second area may be associated with the middle passengers' seats, and a third area may be associated with a rear passenger's seat. Each area 308 may include one or more sensors that are positioned or operate to provide environmental information about that area 308.

[0079] Each area 308 may be further separated into one or more zones 312 within the area 308. For example, area 1 308A may be separated into zone A, 312a, and zone B, 312b. Each zone 312 may be associated with a particular portion of the interior occupied by a passenger. For example, zone A, 312a may be associated with a driver. Zone B, 312b, may be associated with a front passenger. Each zone 312 may include one or more sensors that are positioned or configured to collect information about the environment or ecosystem associated with that zone or person.

[0080] A passenger area 308b may include more than two zones as described in conjunction with area 308a. For example, area 308b may include three zones, 312c, 312d, and 312e. These three separate zones 312c, 312d, and 312e may be associated with three passenger seats typically found in the rear passenger area of an automobile 104. An area 308N may include a single zone 312N as there may be no separate passenger areas but may include be a single trunk area within the vehicle 104. The number of zones 312 is unlimited within the areas as the areas are also unlimited inside the vehicle 104. Further,

it should be noted that there may be one or areas 308 or zones 312 that may be located outside the vehicle 104 that may have a specific set of sensors associated therewith.

[0081] A set of sensors or vehicle components 400 associated with the vehicle 404 may be as shown in Fig. 4. The vehicle 104 includes, among many other components common to vehicles, wheels 407, a power source 409 (such as an engine, motor, or energy storage system (e.g., battery or capacitive energy storage system)), a manual or automatic transmission 412, a manual or automatic transmission gear controller 416, a power controller 420 (such as a throttle), a vehicle control system 204, the display device 212, a braking system 436, a steering wheel 440, a power source activation/deactivation switch 444 (e.g., an ignition), an occupant seating system 448, a wireless signal receiver 453 to receive wireless signals from signal sources such as roadside beacons and other electronic roadside devices, and a satellite positioning system receiver 457 (e.g., a Global Positioning System (“GPS”) (US), GLONASS (Russia), Galileo positioning system (EU), Compass navigation system (China), and Regional Navigational Satellite System (India) receiver).

[0082] The vehicle 104 includes a number of sensors in wireless or wired communication with the vehicle control system 204 and/or display device 212 to collect sensed information regarding the vehicle state, configuration, and/or operation. Exemplary sensors include wheel state sensor 460 to sense one or more of vehicle speed, acceleration, deceleration, wheel rotation, wheel speed (e.g., wheel revolutions-per-minute), wheel slip, and the like, a power source energy output sensor 464 to sense a power output of the power source 409 by measuring one or more of current engine speed (e.g., revolutions-per-minute), energy input and/or output (e.g., voltage, current, fuel consumption, and torque) (e.g., turbine speed sensor, input speed sensor, crankshaft position sensor, manifold absolute pressure sensor, mass flow sensor, and the like), and the like, a switch state sensor 468 to determine a current activation or deactivation state of the power source activation/deactivation switch 444, a transmission setting sensor 470 to determine a current setting of the transmission (e.g., gear selection or setting), a gear controller sensor 472 to determine a current setting of the gear controller 416, a power controller sensor 474 to determine a current setting of the power controller 420, a brake sensor 476 to determine a current state (braking or non-braking) of the braking system 436, a seating system sensor 478 to determine a seat setting and current weight of seated occupant, if any) in a selected seat of the seating system 448, exterior and interior sound receivers 490 and 492 (e.g., a microphone and other type of acoustic-to-electric transducer or sensor) to receive and convert sound waves into an equivalent analog or digital signal.

Examples of other sensors (not shown) that may be employed include safety system state sensors to determine a current state of a vehicular safety system (e.g., air bag setting (deployed or undeployed) and/or seat belt setting (engaged or not engaged)), light setting sensor (e.g., current headlight, emergency light, brake light, parking light, fog light, interior or passenger compartment light, and/or tail light state (on or off)), brake control (e.g., pedal) setting sensor, accelerator pedal setting or angle sensor, clutch pedal setting sensor, emergency brake pedal setting sensor, door setting (e.g., open, closed, locked or unlocked) sensor, engine temperature sensor, passenger compartment or cabin temperature sensor, window setting (open or closed) sensor, one or more cameras or other imaging sensors (which commonly convert an optical image into an electronic signal but may include other devices for detection objects such as an electromagnetic radiation emitter/receiver that emits electromagnetic radiation and receives electromagnetic waves reflected by the object) to sense objects, such as other vehicles and pedestrians and optionally determine the distance, trajectory and speed of such objects, in the vicinity or path of the vehicle, odometer reading sensor, trip mileage reading sensor, wind speed sensor, radar transmitter/receiver output, brake wear sensor, steering/torque sensor, oxygen sensor, ambient lighting sensor, vision system sensor, ranging sensor, parking sensor, heating, venting, and air conditioning (HVAC) sensor, water sensor, air-fuel ratio meter, blind spot monitor, hall effect sensor, microphone, radio frequency (RF) sensor, infrared (IR) sensor, vehicle control system sensors, wireless network sensor (e.g., Wi-Fi and/or Bluetooth sensor), cellular data sensor, and other sensors known to those of skill in the vehicle art.

[0083] In the depicted vehicle embodiment, the various sensors are in communication with the display device 212 and vehicle control system 204 via signal carrier network 480. As noted, the signal carrier network 480 can be a network of signal conductors, a wireless network (e.g., a radio frequency, microwave, or infrared communication system using a communications protocol, such as Wi-Fi), or a combination thereof.

[0084] In one implementation, the control system 424 receives and reads sensor signals, such as wheel and engine speed signals, as a digital input comprising, for example, a pulse width modulated (PWM) signal. The processor 304 can be configured, for example, to read each of the signals into a port configured as a counter or configured to generate an interrupt on receipt of a pulse, such that the processor 304 can determine, for example, the engine speed in revolutions per minute (RPM) and the speed of the vehicle in miles per hour (MPH). One skilled in the art will recognize that the two signals can be received

from existing sensors in a vehicle comprising a tachometer and a speedometer, respectively. Alternatively, the current engine speed and vehicle speed can be received in a communication packet as numeric values from a conventional dashboard subsystem comprising a tachometer and a speedometer. The transmission speed sensor signal can be similarly received as a digital input comprising a signal coupled to a counter or interrupt signal of the processor 304, or received as a value in a communication packet on the network or port interface 352 from an existing subsystem of the vehicle. The ignition sensor signal can be configured as a digital input, wherein a HIGH value represents that the ignition is on and a LOW value represents that the ignition is OFF. Three bits of the port interface 352 can be configured as a digital input to receive the gear shift position signal, representing eight possible gear shift positions. Alternatively, the gear shift position signal can be received in a communication packet as a numeric value on the port interface 352. The throttle position signal can be received as an analog input value, typically in the range 0-5 volts. Alternatively, the throttle position signal can be received in a communication packet as a numeric value on the port interface 352. The output of other sensors can be processed in a similar fashion.

[0085] Other sensors may be included and position in the interior space 108 of the vehicle 104. Generally, these interior sensors obtain data about the health of the driver and/or passenger(s), data about the safety of the driver and/or passenger(s), and/or data about the comfort of the driver and/or passenger(s). The health data sensors can include sensors in the steering wheel that can measure various health telemetry for the person (*e.g., heart rate, temperature, blood pressure, blood presence, blood composition, etc.*). Sensors in the seats may also provide for health telemetry (*e.g., presence of liquid, weight, weight shifts, etc.*). Infrared sensors could detect a person's temperature; optical sensors can determine a person's position and whether the person has become unconscious. Other health sensors are possible and included herein.

[0086] Safety sensors can measure whether the person is acting safely. Optical sensors can determine a person's position and focus. If the person stops looking at the road ahead, the optical sensor can detect the lack of focus. Sensors in the seats may detect if a person is leaning forward or may be injured by a seat belt in a collision. Other sensors can detect that the driver has at least one hand on a steering wheel. Other safety sensors are possible and contemplated as if included herein.

[0087] Comfort sensors can collect information about a person's comfort. Temperature sensors may detect a temperature of the interior cabin. Moisture sensors can determine a

relative humidity. Audio sensors can detect loud sounds or other distractions. Audio sensors may also receive input from a person through voice data. Other comfort sensors are possible and contemplated as if included herein.

[0088] An embodiment of a vehicle control system 204 and its associated components 204 may be as shown in Fig. 5. In general, the device 212 includes a front screen 212 with a touch sensitive display 568. The front screen 212 may be disabled and/or enabled by a suitable command. Moreover, the front screen 212 can be touch sensitive and can include different operative areas. For example, a first operative area, within the touch sensitive screen 212, may comprise a touch sensitive display 568. In general, the touch sensitive display 568 may comprise a full color, touch sensitive display. A second area within each touch sensitive screen 568 may comprise a gesture capture region 572. The gesture capture region 572 may comprise one or more areas or regions that is outside of the touch sensitive display 568 area or screen area 212, and that is capable of receiving input, for example in the form of gestures provided by a user. However, the one or more gesture capture regions 572 do not include pixels that can perform a display function or capability.

[0089] It is further anticipated that a third region of the touch sensitive screen 568 may comprise one or more configurable areas. The configurable area is capable of receiving input and has display or limited display capabilities. As can be appreciated, the configurable area may occupy any part of the touch sensitive screen 568 not allocated to a gesture capture region 572 or touch sensitive display 568. In embodiments, the configurable area may present different input options to the user. For example, the configurable area may display buttons or other relatable items. Moreover, the identity of displayed buttons, or whether any buttons are displayed at all within the configurable area of the touch sensitive screen 568 may be determined from the context in which the device 212 is used and/or operated. In an exemplary embodiment, the touch sensitive screen 568 comprises liquid crystal display devices extending across at least the region of the touch sensitive screen 568 that is capable of providing visual output to a user, and a resistive and/or capacitive input matrix over the regions of the touch sensitive screen 568 that are capable of receiving input from the user.

[0090] One or more display controllers 516 may be provided for controlling the operation of the touch sensitive screen 568, including input (touch sensing) and output (display) functions. In the exemplary embodiment illustrated in Fig. 5, a touch screen controller 516 is provided for the touch screen 568. In accordance with some

embodiments, the functions of a touch screen controller 516 may be incorporated into other components, such as a processor 504.

[0091] The processor 504 may comprise a general purpose programmable processor or controller for executing application programming or instructions. In accordance with at least some embodiments, the processor 504 may include multiple processor cores, and/or implement multiple virtual processors. In accordance with still other embodiments, the processor 504 may include multiple physical processors. As a particular example, the processor 504 may comprise a specially configured application specific integrated circuit (ASIC) or other integrated circuit, a digital signal processor, a controller, a hardwired electronic or logic circuit, a programmable logic device or gate array, a special purpose computer, or the like. The processor 504 generally functions to run programming code or instructions implementing various functions of the device 212.

[0092] A device 212 may also include memory 508 for use in connection with the execution of application programming or instructions by the processor 504, and for the temporary or long term storage of program instructions and/or data. As examples, the memory 508 may comprise RAM, DRAM, SDRAM, or other solid state memory. Alternatively or in addition, data storage 512 may be provided. Like the memory 508, the data storage 512 may comprise a solid state memory device or devices. Alternatively or in addition, the data storage 512 may comprise a hard disk drive or other random access memory.

[0093] In support of communications functions or capabilities, the device 212 can include a cellular telephony module 528. As examples, the cellular telephony module 528 can comprise a GSM, CDMA, FDMA and/or analog cellular telephony transceiver capable of supporting voice, multimedia and/or data transfers over a cellular network. Alternatively or in addition, the device 212 can include an additional or other wireless communications module 532. As examples, the other wireless communications module 532 can comprise a Wi-Fi, BLUETOOTH™, WiMax, infrared, or other wireless communications link. The cellular telephony module 528 and the other wireless communications module 532 can each be associated with a shared or a dedicated antenna 524.

[0094] A port interface 552 may be included. The port interface 552 may include proprietary or universal ports to support the interconnection of the device 212 to other devices or components, such as a dock, which may include additional or different capabilities from those integral to the device 212. In addition to supporting an exchange

of communication signals between the device 212 and another device or component, the docking port (not shown) and/or port interface 552 can support the supply of power to or from the device 212. The port interface 552 also comprises an intelligent element that comprises a docking module for controlling communications or other interactions between the device 212 and a connected device or component.

[0095] An input/output module 548 and associated ports may be included to support communications over wired networks or links, for example with other communication devices, server devices, and/or peripheral devices. Examples of an input/output module 548 include an Ethernet port, a Universal Serial Bus (USB) port, Institute of Electrical and Electronics Engineers (IEEE) 1594, or other interface.

[0096] An audio input/output interface/device(s) 544 can be included to provide analog audio to an interconnected speaker or other device, and to receive analog audio input from a connected microphone or other device. As an example, the audio input/output interface/device(s) 544 may comprise an associated amplifier and analog to digital converter. Alternatively or in addition, the device 212 can include an integrated audio input/output device 556 and/or an audio jack for interconnecting an external speaker or microphone. For example, an integrated speaker and an integrated microphone can be provided, to support near talk or speaker phone operations.

[0097] Hardware buttons 280 can be included for example for use in connection with certain control operations. Examples include a master power switch, volume control, etc., as described in conjunction with Fig. 2. One or more image capture interfaces/devices, such as a camera, can be included for capturing still and/or video images. Alternatively or in addition, an image capture interface/device can include a scanner or code reader. An image capture interface/device can include or be associated with additional elements, such as a flash or other light source.

[0098] The device 212 can also include a global positioning system (GPS) receiver 536. In accordance with embodiments of the present invention, the GPS receiver 536 may further comprise a GPS module that is capable of providing absolute location information to other components of the device 212. Other sensors 242 may also be included. For example, an accelerometer(s)/gyroscope(s) may also be included. For example, in connection with the display of information to a user and/or other functions, a signal from the accelerometer/gyroscope can be used to determine an orientation and/or format in which to display that information to the user. In some embodiments, the

accelerometer/gyroscope may comprise at least one accelerometer and at least one gyroscope.

[0099] Embodiments of the present invention can also include one or more magnetic sensing feature. The magnetic sensing feature can be configured to provide a signal indicating the position of the device relative to a vehicle-mounted position. This information can be provided as an input, for example to a user interface application, to determine an operating mode, characteristics of the touch sensitive display 568 and/or other device 212 operations. As examples, a magnetic sensing feature can comprise one or more of Hall-effect sensors, a multiple position switch, an optical switch, a Wheatstone bridge, a potentiometer, or other arrangement capable of providing a signal indicating of multiple relative positions the touch screens are in. Alternatively, the magnetic sensing feature may comprise one or more metallic elements used by other sensors associated with the console and/or vehicle to determine whether the device 212 is in a vehicle-mounted position. These metallic elements may include but are not limited to rare-earth magnets, electromagnets, ferrite and/or ferrite alloys, and/or other material capable of being detected by a range of sensors.

[0100] Communications between various components of the device 212 can be carried by one or more buses 520. In addition, power can be supplied to the components of the device 212 from a power source and/or power control module 560. The power control module 560 can, for example, include a battery, an AC to DC converter, power control logic, and/or ports for interconnecting the device 212 to an external source of power.

[0101] An embodiment of one or more software modules that may be associated with the vehicle control system 204 may be as shown in Fig. 6. The memory 508 may store and the processor 504 may execute one or more software components. These components can include at least one operating system (OS) 616, an application manager 662, a console desktop 666, and/or one or more applications 664a and/or 664b from an application store 660. The OS 616 can include a framework 620, one or more frame buffers 648, one or more drivers 612, and/or a kernel 618. The OS 616 can be any software, consisting of programs and data, which manages computer hardware resources and provides common services for the execution of various applications 664. The OS 616 can be any operating system and, at least in some embodiments, dedicated to mobile devices, including, but not limited to, Linux, ANDROID™, iPhone OS (IOS™), WINDOWS PHONE 7™, etc. The OS 616 is operable to provide functionality to the device 212 by executing one or more operations, as described herein.

[0102] The applications 664 can be any higher level software that executes particular console functionality for the user. Applications 664 can include programs such as vehicle control applications, email clients, web browsers, texting applications, games, media players, office suites, etc. The applications 664 can be stored in an application store 660, which may represent any memory or data storage, and the management software associated therewith, for storing the applications 664. Once executed, the applications 664 may be run in a different area of memory 608.

[0103] The framework 620 may be any software or data that allows the multiple tasks running on the device to interact. In embodiments, at least portions of the framework 620 and the discrete components described hereinafter may be considered part of the OS 616 or an application 664. However, these portions will be described as part of the framework 620, but those components are not so limited. The framework 620 can include, but is not limited to, a Surface Cache module 628, a Window Management module 632, an Input Management module 636, an Application Model Manager 642, a Display Controller 644, one or more frame buffers 648, and/or an event buffer 666.

[0104] The Surface Cache module 628 includes any memory or storage and the software associated therewith to store or cache one or more images of applications, windows, and/or console screens. A series of active and/or non-active windows (or other display objects, such as, a desktop display) can be associated with each display. An active window (or other display object) is currently displayed. A non-active window (or other display objects) was opened and, at some time, displayed but are now not displayed. To enhance the user experience, before a window transitions from an active state to an inactive state, a “screen shot” of a last generated image of the window (or other display object) can be stored. The Surface Cache module 628 may be operable to store a bitmap of the last active image of a window (or other display object) not currently displayed. Thus, the Surface Cache module 628 stores the images of non-active windows (or other display objects) in a data store.

[0105] In embodiments, the Window Management module 632 is operable to manage the windows (or other display objects) that are active or not active on each of the displays. The Window Management module 632, based on information from the OS 616, or other components, determines when a window (or other display object) is visible or not active. The Window Management module 632 may then put a non-visible window (or other display object) in a “not active state” and, in conjunction with the Task Management module 640 suspends the application’s operation. Further, the Window Management

module 632 may assign a display identifier to the window (or other display object) or manage one or more other items of data associated with the window (or other display object). The Window Management module 632 may also provide the stored information to the application 664, or other components interacting with or associated with the window (or other display object). The Window Management module 632 can also associate an input task with a window based on window focus and display coordinates within the motion space.

[0106] The Input Management module 636 is operable to manage events that occur with the device. An event is any input into the window environment, for example, a user interface interactions with a user. The Input Management module 636 receives the events and logically stores the events in an event buffer 656. Events can include such user interface interactions as a “down event,” which occurs when the screen 204 receives a touch signal from a user, a “move event,” which occurs when the screen 204 determines that a user’s finger is moving across a screen(s), an “up event”, which occurs when the device 212 determines that the user has stopped touching the screen 568 etc. These events are received, stored, and forwarded to other modules by the Input Management module 636. The Input Management module 636 may also map screen inputs to a motion space which is the culmination of all physical and virtual display available on the device.

[0107] The frame buffer 648 is a logical structure(s) used to render the user interface. The frame buffer 648 can be created and destroyed by the OS kernel 618. However, the Display Controller 644 can write the image data, for the visible windows, into the frame buffer 648. A frame buffer 648 can be associated with one screen or multiple screens. The association of a frame buffer 648 with a screen can be controlled dynamically by interaction with the OS kernel 618. A composite display may be created by associating multiple screens with a single frame buffer 648. Graphical data used to render an application’s window user interface may then be written to the single frame buffer 648, for the composite display, which is output to the multiple screens 204. The Display Controller 644 can direct an application’s user interface to a portion of the frame buffer 648 that is mapped to a particular display 208, thus, displaying the user interface on only one screen 212. The Display Controller 644 can extend the control over user interfaces to multiple applications, controlling the user interfaces for as many displays as are associated with a frame buffer 648 or a portion thereof. This approach compensates for the physical screen 212 and any other console screens that are in use by the software component above the Display Controller 644.

[0108] The Application Manager 662 is an application that provides a presentation layer for the window environment. Thus, the Application Manager 662 provides the graphical model for rendering. Likewise, the Desktop 666 provides the presentation layer for the Application Store 660. Thus, the desktop provides a graphical model of a surface having selectable application icons for the Applications 664 in the Application Store 660 that can be provided to the Window Management Module 632 for rendering.

[0109] Further, the framework can include an Application Model Manager (AMM) 642. The Application Manager 662 may interface with the AMM 642. In embodiments, the AMM 642 receives state change information from the device 212 regarding the state of applications (which are running or suspended). The AMM 642 can associate bit map images from the Surface Cache Module 628 to the applications that are alive (running or suspended). Further, the AMM 642 may provide a list of executing applications to the Application Manager 662.

[0110] One or more gestures used to interface with the vehicle control system 204 may be as described in conjunction with figures 7A through 7K. Figs. 7A through 7H depict various graphical representations of gesture inputs that may be recognized by the screen(s) 212. The gestures may be performed not only by a user's body part, such as a digit, but also by other devices, such as a stylus, that may be sensed by the contact sensing portion(s) of a screen 212. In general, gestures are interpreted differently, based on where the gestures are performed (either directly on the display 568 or in the gesture capture region 572). For example, gestures in the display 568 may be directed to a desktop or application, and gestures in the gesture capture region 572 may be interpreted as for the system.

[0111] With reference to Figs. 7A-7H, a first type of gesture, a touch gesture 720, is substantially stationary on the screen 212 for a selected length of time. A circle 728 represents a touch or other contact type received at particular location of a contact sensing portion of the screen. The circle 728 may include a border 732, the thickness of which indicates a length of time that the contact is held substantially stationary at the contact location. For instance, a tap 720 (or short press) has a thinner border 732a than the border 732b for a long press 724 (or for a normal press). The long press 724 may involve a contact that remains substantially stationary on the screen for longer time period than that of a tap 720. As will be appreciated, differently defined gestures may be registered depending upon the length of time that the touch remains stationary prior to contact cessation or movement on the screen.

[0112] With reference to Fig. 7C, a drag gesture 700 on the screen 212 is an initial contact (represented by circle 728) with contact movement 736 in a selected direction. The initial contact 728 may remain stationary on the screen 212 for a certain amount of time represented by the border 732. The drag gesture typically requires the user to contact an icon, window, or other displayed image at a first location followed by movement of the contact in a drag direction to a new second location desired for the selected displayed image. The contact movement need not be in a straight line but have any path of movement so long as the contact is substantially continuous from the first to the second locations.

[0113] With reference to Fig. 7D, a flick gesture 704 on the screen 212 is an initial contact (represented by circle 728) with truncated contact movement 736 (relative to a drag gesture) in a selected direction. In embodiments, a flick has a higher exit velocity for the last movement in the gesture compared to the drag gesture. The flick gesture can, for instance, be a finger snap following initial contact. Compared to a drag gesture, a flick gesture generally does not require continual contact with the screen 212 from the first location of a displayed image to a predetermined second location. The contacted displayed image is moved by the flick gesture in the direction of the flick gesture to the predetermined second location. Although both gestures commonly can move a displayed image from a first location to a second location, the temporal duration and distance of travel of the contact on the screen is generally less for a flick than for a drag gesture.

[0114] With reference to Fig. 7E, a pinch gesture 708 on the screen 212 is depicted. The pinch gesture 708 may be initiated by a first contact 728 to the screen 212 by, for example, a first digit and a second contact 728b to the screen 212 by, for example, a second digit. The first and second contacts 728a,b may be detected by a common contact sensing portion of a common screen 212, by different contact sensing portions of a common screen 212, or by different contact sensing portions of different screens 212. The first contact 728a is held for a first amount of time, as represented by the border 732a, and the second contact 728b is held for a second amount of time, as represented by the border 732b. The first and second amounts of time are generally substantially the same, and the first and second contacts 728a,b generally occur substantially simultaneously. The first and second contacts 728a,b generally also include corresponding first and second contact movements 736a,b, respectively. The first and second contact movements 736 a,b are generally in opposing directions. Stated another way, the first contact movement 736a is towards the second contact 736b, and the second contact movement 736b is towards the first contact

736a. More simply stated, the pinch gesture 708 may be accomplished by a user's digits touching the screen 212 in a pinching motion.

[0115] With reference to Fig. 7F, a spread gesture 710 on the screen 212 is depicted. The spread gesture 710 may be initiated by a first contact 728a to the screen 212 by, for example, a first digit and a second contact 728b to the screen 212 by, for example, a second digit. The first and second contacts 728a,b may be detected by a common contact sensing portion of a common screen 212, by different contact sensing portions of a common screen 212, or by different contact sensing portions of different screens 212. The first contact 728a is held for a first amount of time, as represented by the border 732a, and the second contact 728b is held for a second amount of time, as represented by the border 732b. The first and second amounts of time are generally substantially the same, and the first and second contacts 728a,b generally occur substantially simultaneously. The first and second contacts 728a,b generally also include corresponding first and second contact movements 736a,b, respectively. The first and second contact movements 736a,b are generally in a common direction. Stated another way, the first and second contact movements 736a,b are away from the first and second contacts 728a,b. More simply stated, the spread gesture 710 may be accomplished by a user's digits touching the screen 212 in a spreading motion.

[0116] The above gestures may be combined in any manner, such as those shown by Figs. 7G and 7H, to produce a determined functional result. For example, in Fig. 7G a tap gesture 720 is combined with a drag or flick gesture 712 in a direction away from the tap gesture 720. In Fig. 7H, a tap gesture 720 is combined with a drag or flick gesture 712 in a direction towards the tap gesture 720.

[0117] The functional result of receiving a gesture can vary depending on a number of factors, including a state of the vehicle 104, display 568, or screen 212, a context associated with the gesture, or sensed location of the gesture. The state of the vehicle commonly refers to one or more of a configuration of the vehicle 104, a display orientation, and user and other inputs received by the vehicle 104. Context commonly refers to one or more of the particular application(s) selected by the gesture and the portion(s) of the application currently executing, whether the application is a single- or multi-screen application, and whether the application is a multi-screen application displaying one or more windows. Sensed location of the gesture commonly refers to whether the sensed set(s) of gesture location coordinates are on a touch sensitive display 568 or a gesture capture region 572, whether the sensed set(s) of gesture location

coordinates are associated with a common or different display or screen 212, and/or what portion of the gesture capture region contains the sensed set(s) of gesture location coordinates.

[0118] A tap, when received by an a touch sensitive display 568, can be used, for instance, to select an icon to initiate or terminate execution of a corresponding application, to maximize or minimize a window, to reorder windows in a stack, and to provide user input such as by keyboard display or other displayed image. A drag, when received by a touch sensitive display 568, can be used, for instance, to relocate an icon or window to a desired location within a display, to reorder a stack on a display, or to span both displays (such that the selected window occupies a portion of each display simultaneously). A flick, when received by a touch sensitive display 568 or a gesture capture region 572, can be used to relocate a window from a first display to a second display or to span both displays (such that the selected window occupies a portion of each display simultaneously). Unlike the drag gesture, however, the flick gesture is generally not used to move the displayed image to a specific user-selected location but to a default location that is not configurable by the user.

[0119] The pinch gesture, when received by a touch sensitive display 568 or a gesture capture region 572, can be used to minimize or otherwise increase the displayed area or size of a window (typically when received entirely by a common display), to switch windows displayed at the top of the stack on each display to the top of the stack of the other display (typically when received by different displays or screens), or to display an application manager (a "pop-up window" that displays the windows in the stack). The spread gesture, when received by a touch sensitive display 568 or a gesture capture region 572, can be used to maximize or otherwise decrease the displayed area or size of a window, to switch windows displayed at the top of the stack on each display to the top of the stack of the other display (typically when received by different displays or screens), or to display an application manager (typically when received by an off-screen gesture capture region on the same or different screens).

[0120] The combined gestures of Fig. 7G, when received by a common display capture region in a common display or screen 212, can be used to hold a first window location constant for a display receiving the gesture while reordering a second window location to include a window in the display receiving the gesture. The combined gestures of Fig. 7H, when received by different display capture regions in a common display or screen 212 or in different displays or screens, can be used to hold a first window location for a display

receiving the tap part of the gesture while reordering a second window location to include a window in the display receiving the flick or drag gesture. Although specific gestures and gesture capture regions in the preceding examples have been associated with corresponding sets of functional results, it is to be appreciated that these associations can be redefined in any manner to produce differing associations between gestures and/or gesture capture regions and/or functional results.

[0121] Gestures that may be completed in three-dimensional space and not on a touch sensitive screen 568 or gesture capture region 572 may be as shown in Figs. 7I through 7K. The gestures may be completed in an area where a sensor 242, such as an optical sensor, infrared sensor, or other type of sensor, may detect the gesture. For example, the gesture 740 in Fig. 7I, a person may open their hand 764 and move their hand in a back and forth direction 748 as a gesture 740 to complete some function with the vehicle 104. For example gesture 764 may change the station of the radio in the vehicle 104. The sensors 242 may both determine the configuration of the hand and the vector of the movement. The vector and hand configuration can be interpreted to mean certain things to the vehicle control system 204 and produce different results.

[0122] In another example of a gesture 752 in Fig. 7J, a user may configure their hand 764 to extend two fingers and move the hand in an up and down operation 756. This gesture 752 may control the volume of the radio or some other function. Again, the sensors 242 may determine how the person has configured their hand gesture, and the vector of the movement. In another example of a gesture 760 shown in Fig. 7K, a user may extend their middle three fingers at an angle 45° from straight vertical and circle the hand in a counter-clockwise motion 764. This gesture 760 may cause the automobile to change the heat or do some other function. As can be understood by one skilled in the art, the configurations of the hand and the types of movement are variable. Thus, the user may configure the hand 764 in any way imaginable and may also move that hand 764 in any direction with any vector in three-dimensional space.

[0123] The gestures 740, 752, 760, as shown in Fig. 7I through 7K, may occur in a predetermined volume of space within the vehicle 104. For example, a sensor 242 may be configured to identify such gestures 740, 752, 760 between the front passenger's and front driver's seats over a console area within the passenger compartment of the automobile 104. The gestures 740, 752, 760 may be made within area 1 304a between zones A 312a and B 312b. However, there may be other areas 308 where a user may use certain gestures, where sensors 242 may be able to determine a certain function is desired.

Gestures that may be similar but used in different areas within the vehicle 104 may cause different functions to be performed. For example, the gesture 740 in Fig. 7I, if used in zone E 312e, may change the heat provided in zone E 312e, but may change the station of a radio if used in zone A312a. Further, the gestures may be made with other body parts or, for example, different expressions of a persons' face may be used to control functions in the vehicle 104. Also, the user may use two hands in some circumstances or do other types of physical movements that can cause different reactions in the vehicle 104.

[0124] An embodiment of a data structure 800 to store different settings is shown in Fig. 8. The data structure 800 may include one or more of data files or data objects 804. Thus, the data structure 800 may represent different types of data bases or data storage, for example, object-oriented data bases, flat file data structures, relational database, or other types of data storage arrangements. The data file 804 may include several portions 808-836 representing different types of data. Each of these types of data may be associated with a user, as shown in portion 808.

[0125] There may be one or more user records 840 and associated data stored within the data file 804. The user can be any person that uses or rides within the vehicle or conveyance 104. The user may be identified in portion 812. For the vehicle 104, the user may include a set of one or more features that may identify the user. These features may be the physical characteristics of the person that may be identified by facial recognition or some other type of system. In other embodiments, the user may provide a unique code to the vehicle control system 204 or provide some other type of data that allows the vehicle control system 204 to identify the user. The features or characteristics of the user are then stored in portion 812.

[0126] Each user identified in portion 808 may have a different set of settings for each area 308 and/or each zone 312 within the vehicle 104. Thus, each set of setting may also be associated with a predetermined zone 312 or area 308. The zone 312 is stored in portion 820 and the area 308 is stored in portion 816.

[0127] One or more settings may be stored in portion 824. These settings 824 may be the configurations of different functions within the vehicle 104 that are specified by or for that user. For example, the settings 824 may be the position of a seat, the position of a steering wheel, a heating/cooling setting, a radio setting, a cruise control setting, or some other type of setting associated with the vehicle 104. Further, in vehicles adapted to have a configurable console or a configurable dash or heads-up display, the settings 824 may also provide for how that heads-up display, dash, or console are configured for this

particular user. Each setting 824 may be associated with a different area 308 or zone 312. Thus, there may be more settings 824 for when the user is the driver and in zone A, 312A, of area 1, 308A. However, there may be similar settings 824 among the different zones 312 or areas 308 as shown in portion 824. For example, the heating or radio settings for the user may be similar in every zone 312.

[0128] The sensors 242 within the vehicle 104 may be able to either obtain or track health data in portion 828. Health data 828 may include any type of physical characteristic associated with the user. For example, a heart rate, a blood pressure, a temperature, or other types of health data may be obtained and stored in portion 828. The user may have this health data tracked over a period of time to allow for statistical analysis of the user's health while operating the vehicle 104. In this way if some function of the user's health deviates from a norm, the vehicle 104 may be able to determine there is a problem with the person and react to that data.

[0129] One or more gestures may be stored in portion 832. Thus, the gestures used and described in conjunction Fig. 7A through 7K may be configurable. These gestures may be determined or created by the user and stored in portion 832. A user may have different gestures for each zone 312 or area 308 within the vehicle. The gestures that do certain things while driving may do other things while in a different area 308 of the vehicle 104. Thus, the user may use a first set of gestures while driving and a second set while a passenger. Further, one or more users may share gestures as shown in portion 832. Each driver may have a common set of gestures that they use in zone A, 312a. Each of these gestures may be determined or captured and then stored with their average characteristics (e.g., vector, position of gesture, etc.) in portion 832.

[0130] One or more sets of safety parameters may be stored in portion 836. Safety parameters 836 may be common operating characteristics for this driver/passenger or for all drivers/passengers that if deviated from may determine there is a problem with the driver/passenger or the vehicle 104. For example, a certain route may be taken repeatedly and an average speed or mean speed may be determined. If the mean speed deviates by some number of standard deviations, a problem with the vehicle 104 or the user may be determined. In another example, the health characteristics or driving experience of the user may be determined. If the user drives in a certain position where their head occupies a certain portion of three-dimensional space within the vehicle 104, the vehicle control system 204 may determine that the safety parameter includes the user's face or head being within this certain portion of the vehicle interior space. If the user's head deviates from

that interior space for some amount of time, the vehicle control system 204 can determine that something is wrong with the driver and change the function or operation of the vehicle 104 to assist the driver. This may happen, for example, when a user falls asleep at the wheel. If the user's head droops and does no longer occupy a certain three dimensional space, the vehicle control system 204 can determine that the driver has fallen asleep and may take control of the operation of the vehicle 204 and steer the vehicle 204 to the side of the road. In other examples, if the user's reaction time is too slow or some other safety parameter is not nominal, the vehicle control system 204 may determine that the user is inebriated or having some other medical problem. The vehicle control system 204 may then assume control of the vehicle to ensure that the driver is safe.

[0131] An embodiment of a universal chassis 900 for a head unit of a vehicle 104 is shown in Figs. 9A through 9C. The universal chassis 900 may have a structure or frame that includes a top and bottom face, two side faces, a back, and front structure. The front structure may form two or more openings or cavities 904 that are substantially similar in dimension. The cavities may be formed in the front face by at least two styles 912 and two or more rails 908. The cavities 904 can extend through the structure of the universal chassis 900.

[0132] A component or module 928 may be inserted into the cavity 904. Each module 928 has a common size or common physical dimensions. Thus, any module 928 may be inserted into any cavity 904. Each module 928 may have a different function or perform different operations but each has the same form factor. The modules 928 inserted in the cavities can have a same exterior configuration, although the functional performance or components within those modules 928 may be different. Thus, the chassis 900 allows for a universal system for accepting different modules 928 yet allow the builder to configure the components within the chassis 900 to perform different functions. The modules 928 can be any type of computing system, storage system, or other type of device that performs functions for the vehicle 104.

[0133] The universal chassis 900 may include on the back or unexposed portion of the chassis 900, a universal connection configuration. These connections may include a power bus 924 that includes different ports 920 connected by a single power bar 924 or other type of wiring arrangement. Thus, each module 928 can have a similar configuration that can connect to the power bus 924. Further, the universal chassis 900 may also include an input/output bus 932. The input/output bus 932 may have similar configurations with a connection for each cavity 904 of the universal chassis 900. The I/O

bus 932 can be any type of bus or may include several buses that may be connected to any of the modules 928. The I/O buses may be Ethernet, a CAN bus, or other types of communication systems.

[0134] The universal chassis 900 may be mechanically connected to the head unit or slipped into the head unit where only the front face is available to mount devices to the head unit. The universal chassis 900 may also include connection points for a display device (e.g., touch sensitive screen 568) or other type of interface to cover the front of the universal chassis 900 and provide for viewing information on a user interface.

[0135] An electrical diagram 1000 showing the connections to the modules 928 is shown in Fig. 10. Here, the electrical connections to the modules 928 for the power bus 924 is shown. The power bus 924 can electrically connect to a power system 1004, which may provide a common amount of power (i.e., common voltage and amperage) over the power bus 924. Further, the I/O bus 932 can connect to each module 928 as shown. The I/O bus 932 may connect to the vehicle control system 204. Thus, each module 928, regardless of its common form factor, may connect to the vehicle control system 204 and power system 1004. This common connection configuration allows for easy configuration, adaptation, and manipulation of the vehicle's operation.

[0136] Visual diagrams for how the universal bus 900 may appear in the head unit 1100 are shown in Figs. 11A through 11C. In Fig. 11A, the universal chassis 900 is shown in the head unit 1100. The screen or overlay for the universal chassis 900 is removed in Fig. 11A, which can expose the components 928 and cavities 904 to allow for the insertion or exchange of modules 928 in the universal chassis 900.

[0137] The universal chassis 900 may be configurable in that different modules 928 may be inserted in different arrangements or configurations. Thus, the user may add different modules 928 based on what functions the user desires the vehicle 104 to perform. For example, one module 928a may be a computing system providing different computing information. Another module 928b may be a storage system that can store multimedia data. Another module 928 may be a communication component that allows for different wireless communications. There may be other types of components or module 928 that may also be used in the universal chassis 900.

[0138] The universal chassis 900 is also configurable for how displays or other I/O are provided to the user. In Fig. 11B, a single screen 1104 is shown covering the entire universal chassis 900. Thus, this one screen 1104 can provide different user interfaces to the user and be configurable visually. However, it is also possible, as shown in Fig. 11C,

to have multiple screens. In Fig. 11C, there are two screens 1104a and 1104b. A space may be provided between the screens 1104a and 1104b to provide access to one of the components 928 of the universal chassis 900. This one component 928 may provide for different I/O or user interface inputs on the front face of the component 928. For example, if the user desires to have mechanical radio controls, the component 928 may provide those radio controls on its face. In this way, the front face of the universal chassis is configurable and provides different mechanical and electrical connections.

[0139] Furthermore, while the exemplary aspects, embodiments, and/or configurations illustrated herein show the various components of the system collocated, certain components of the system can be located remotely, at distant portions of a distributed network, such as a LAN and/or the Internet, or within a dedicated system. Thus, it should be appreciated, that the components of the system can be combined in to one or more devices, such as a tablet-like device, or collocated on a particular node of a distributed network, such as an analog and/or digital telecommunications network, a packet-switch network, or a circuit-switched network. It will be appreciated from the preceding description, and for reasons of computational efficiency, that the components of the system can be arranged at any location within a distributed network of components without affecting the operation of the system. For example, the various components can be located in a switch such as a PBX and media server, gateway, in one or more communications devices, at one or more users' premises, or some combination thereof. Similarly, one or more functional portions of the system could be distributed between a telecommunications device(s) and an associated computing device.

[0140] Furthermore, it should be appreciated that the various links connecting the elements can be wired or wireless links, or any combination thereof, or any other known or later developed element(s) that is capable of supplying and/or communicating data to and from the connected elements. These wired or wireless links can also be secure links and may be capable of communicating encrypted information. Transmission media used as links, for example, can be any suitable carrier for electrical signals, including coaxial cables, copper wire and fiber optics, and may take the form of acoustic or light waves, such as those generated during radio-wave and infra-red data communications.

[0141] Also, while the flowcharts have been discussed and illustrated in relation to a particular sequence of events, it should be appreciated that changes, additions, and omissions to this sequence can occur without materially affecting the operation of the disclosed embodiments, configuration, and aspects.

[0142] In yet another embodiment, the systems and methods of this disclosure can be implemented in conjunction with a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device or gate array such as PLD, PLA, FPGA, PAL, special purpose computer, any comparable means, or the like. In general, any device(s) or means capable of implementing the methodology illustrated herein can be used to implement the various aspects of this disclosure. Exemplary hardware that can be used for the disclosed embodiments, configurations and aspects includes computers, handheld devices, telephones (e.g., cellular, Internet enabled, digital, analog, hybrids, and others), and other hardware known in the art. Some of these devices include processors (e.g., a single or multiple microprocessors), memory, nonvolatile storage, input devices, and output devices. Furthermore, alternative software implementations including, but not limited to, distributed processing or component/object distributed processing, parallel processing, or virtual machine processing can also be constructed to implement the methods described herein.

[0143] In yet another embodiment, the disclosed methods may be readily implemented in conjunction with software using object or object-oriented software development environments that provide portable source code that can be used on a variety of computer or workstation platforms. Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or VLSI design. Whether software or hardware is used to implement the systems in accordance with this disclosure is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized.

[0144] In yet another embodiment, the disclosed methods may be partially implemented in software that can be stored on a storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. In these instances, the systems and methods of this disclosure can be implemented as program embedded on personal computer such as an applet, JAVA® or CGI script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated measurement system, system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system.

[0145] Although the present disclosure describes components and functions implemented in the aspects, embodiments, and/or configurations with reference to particular standards and protocols, the aspects, embodiments, and/or configurations are not limited to such standards and protocols. Other similar standards and protocols not mentioned herein are in existence and are considered to be included in the present disclosure. Moreover, the standards and protocols mentioned herein and other similar standards and protocols not mentioned herein are periodically superseded by faster or more effective equivalents having essentially the same functions. Such replacement standards and protocols having the same functions are considered equivalents included in the present disclosure.

[0146] The present disclosure, in various aspects, embodiments, and/or configurations, includes components, methods, processes, systems and/or apparatus substantially as depicted and described herein, including various aspects, embodiments, configurations, subcombinations, and/or subsets thereof. Those of skill in the art will understand how to make and use the disclosed aspects, embodiments, and/or configurations after understanding the present disclosure. The present disclosure, in various aspects, embodiments, and/or configurations, includes providing devices and processes in the absence of items not depicted and/or described herein or in various aspects, embodiments, and/or configurations hereof, including in the absence of such items as may have been used in previous devices or processes, e.g., for improving performance, achieving ease and/or reducing cost of implementation.

[0147] The foregoing discussion has been presented for purposes of illustration and description. The foregoing is not intended to limit the disclosure to the form or forms disclosed herein. In the foregoing Detailed Description for example, various features of the disclosure are grouped together in one or more aspects, embodiments, and/or configurations for the purpose of streamlining the disclosure. The features of the aspects, embodiments, and/or configurations of the disclosure may be combined in alternate aspects, embodiments, and/or configurations other than those discussed above. This method of disclosure is not to be interpreted as reflecting an intention that the claims require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive aspects lie in less than all features of a single foregoing disclosed aspect, embodiment, and/or configuration. Thus, the following claims are hereby incorporated into this Detailed Description, with each claim standing on its own as a separate preferred embodiment of the disclosure.

[0148] Moreover, though the description has included description of one or more aspects, embodiments, and/or configurations and certain variations and modifications, other variations, combinations, and modifications are within the scope of the disclosure, e.g., as may be within the skill and knowledge of those in the art, after understanding the present disclosure. It is intended to obtain rights which include alternative aspects, embodiments, and/or configurations to the extent permitted, including alternate, interchangeable and/or equivalent structures, functions, ranges or steps to those claimed, whether or not such alternate, interchangeable and/or equivalent structures, functions, ranges or steps are disclosed herein, and without intending to publicly dedicate any patentable subject matter.

[0149] Embodiment of the disclosure include a vehicle console, comprising: a head unit; a chassis inserted into the head unit and mechanically attached to the head unit, the chassis comprising: at least two rails; at least two stiles, wherein the at least two rails and at least two stiles form at least two cavities in the chassis; a first module inserted into a first cavity; and a second module inserted into a second cavity, wherein the first module and the second module perform different operations. Each cavity and each module can have common dimensions.

[0150] The chassis can include a power bus, wherein each cavity includes a power connector configured to mate with the first or second module and electrically connected to the power bus. The chassis can also include an input/output (I/O) bus, wherein each cavity includes an I/O connector configured to mate with the first or second module and electrically connected to the I/O bus. The chassis can further comprise at least one connection point on a front face of the chassis, wherein a display device can be mounted to the connection point, covering the front face of the chassis, and in communication with the first or second module.

[0151] Embodiment of the disclosure include a chassis that mounts into a head unit of a vehicle. The chassis can comprise: a back face; two side faces; a top; a bottom; two or more cavities formed into the chassis; a front face, the front face comprising: at least two rails; at least two stiles, wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis; a first module inserted into a first cavity; and a second module inserted into a second cavity, wherein the first and second modules perform different functions.

[0152] The chassis can include at least one module inserted into a third cavity that performs different functions from the first or second modules.

[0153] The chassis can include a power bus mounted to the back face of the chassis; a power connector mounted on the back face and configured to mate with the first, second, or third modules and electrically connected to the power bus; an input/output (I/O) bus mounted to the back face of the chassis; and an I/O connector mounted on the back face, configured to mate with the first, second, or third modules, and electrically connected to the I/O bus.

[0154] Further, the chassis can include at least one connection point on a front face of the chassis; and at least two display devices mounted to the connection point, covering at least a portion of the front face of the chassis, and electrically connected to at least one module, wherein the two display devices display different information.

[0155] Embodiment of the disclosure include a vehicle comprising: a vehicle console comprising: a head unit; a chassis mounted in the head unit, the chassis comprising: a back face; two side faces; a top; a bottom; two or more cavities formed into the chassis; a front face, the front face comprising: at least two rails; at least two stiles, wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis; and two or more modules mounted in two or more cavities, wherein each module performs a different function.

[0156] Functions performed by the two or more modules can include one or more of, but is not limited to: a radio operation, a climate control operation, a multimedia display operation, a computing system operation, and a storage operation. The vehicle can further comprise: a power bus mounted to the back face of the chassis; a power connector mounted on the back face and configured to mate with a module and electrically connected to the power bus; an input/output (I/O) bus mounted to the back face of the chassis; and an I/O connector mounted on the back face, configured to mate with a module, and electrically connected to the I/O bus; at least one connection point on a front face of the chassis; and at least one display devices mounted to the connection point, covering at least a portion of the front face of the chassis, and electrically connected to at least one module, wherein a portion of at least one module is exposed, wherein the portion provides at least on mechanical control to a user to provide input into a vehicle control system.

[0157] Embodiment of the disclosure include a vehicle console, comprising: a head unit; a chassis inserted into the head unit and mechanically attached to the head unit, the chassis comprising: at least two rails; at least two stiles; and wherein the at least two rails and at

least two stiles form at least two cavities in the chassis, wherein each cavity accepts a module.

[0158] The vehicle console can include one or more modules inserted into a cavity, wherein each cavity has common dimensions, and wherein each module has common dimensions. The chassis can include a power bus, wherein each cavity includes a power connector configured to mate with a module and electrically connected to the power bus, and an input/output (I/O) bus, wherein each cavity includes an I/O connector configured to mate with a module and electrically connected to the I/O bus. The chassis can include at least one connection point on a front face of the chassis, with a display device mounted to the connection point and covering the front face of the chassis.

[0159] Embodiment of the disclosure include a chassis that mounts into a head unit of a vehicle, comprising: a back face; two side faces; a top; a bottom; two or more cavities formed into the chassis; a front face, the front face comprising: at least two rails; at least two stiles; and wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis, wherein each cavity accepts a module.

[0160] The chassis can include one or more modules inserted into a cavity, wherein each cavity has common dimensions, and wherein each module has common dimensions. The chassis can include a power bus mounted to the back face of the chassis; a power connector mounted on the back face and configured to mate with a module and electrically connected to the power bus; an input/output (I/O) bus mounted to the back face of the chassis; and an I/O connector mounted on the back face, configured to mate with a module, and electrically connected to the I/O bus. The chassis can include at least one connection point on a front face of the chassis; and at least two display devices mounted to the connection point, covering the front face of the chassis, and electrically connected to at least one module.

[0161] Embodiment of the disclosure include a vehicle comprising: a vehicle console comprising: a head unit; a chassis mounted in the head unit, the chassis comprising: a back face; two side faces; a top; a bottom; two or more cavities formed into the chassis; a front face, the front face comprising: at least two rails; at least two stiles, wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis; and two or more modules mounted in two or more cavities, wherein each cavity has common dimensions, and wherein each module has common dimensions.

[0162] The vehicle can include a power bus mounted to the back face of the chassis; a power connector mounted on the back face and configured to mate with a module and

electrically connected to the power bus; an input/output (I/O) bus mounted to the back face of the chassis; and an I/O connector mounted on the back face, configured to mate with a module, and electrically connected to the I/O bus, at least one connection point on a front face of the chassis; and at least one display devices mounted to the connection point, covering the front face of the chassis, and electrically connected to at least one module, The vehicle of claim 39, wherein a portion of at least one module is exposed, wherein the portion provides at least on mechanical control to a user to provide input into a vehicle control system.

What is claimed is:

1. A vehicle console, comprising:
a head unit;
a chassis inserted into the head unit and mechanically attached to the head unit, the chassis comprising:
at least two rails;
at least two stiles, wherein the at least two rails and at least two stiles form at least two cavities in the chassis;
a first module inserted into a first cavity; and
a second module inserted into a second cavity.
2. The vehicle console of claim 1, wherein the first module and the second module perform different operations.
3. The vehicle console of claim 2, wherein each cavity has common dimensions.
4. The vehicle console of claim 3, wherein each module has common dimensions.
5. The vehicle console of claim 4, wherein the chassis includes a power bus.
6. The vehicle console of claim 5, wherein each cavity includes a power connector configured to mate with the first or second module and electrically connected to the power bus.
7. The vehicle console of claim 6, wherein the chassis includes an input/output (I/O) bus.
8. The vehicle console of claim 7, wherein each cavity includes an I/O connector configured to mate with the first or second module and electrically connected to the I/O bus.
9. The vehicle console of claim 8, wherein the chassis further comprises at least one connection point on a front face of the chassis.
10. The vehicle console of claim 9, further comprising a display device mounted to the connection point, covering the front face of the chassis, and in communication with the first or second module.
11. A chassis that mounts into a head unit of a vehicle, comprising:
a back face;
two side faces;
a top;

- a bottom;
- two or more cavities formed into the chassis;
- a front face, the front face comprising:
 - at least two rails;
 - at least two stiles, wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis;
 - a first module inserted into a first cavity; and
 - a second module inserted into a second cavity, wherein the first and second modules perform different functions.

12. The chassis of claim 11, further comprising at least one module inserted into a third cavity that performs different functions from the first or second modules.

13. The chassis of claim 12, wherein each cavity has common dimensions, and wherein each module has common dimensions.

14. The chassis of claim 13, further comprising:

- a power bus mounted to the back face of the chassis;
- a power connector mounted on the back face and configured to mate with the first, second, or third modules and electrically connected to the power bus;
- an input/output (I/O) bus mounted to the back face of the chassis; and
- an I/O connector mounted on the back face, configured to mate with the first, second, or third modules, and electrically connected to the I/O bus.

15. The chassis of claim 14, further comprising:

- at least one connection point on a front face of the chassis; and
- at least two display devices mounted to the connection point, covering at least a portion of the front face of the chassis, and electrically connected to at least one module, wherein the two display devices display different information.

16. A vehicle comprising:

- a vehicle console comprising:

- a head unit;

- a chassis mounted in the head unit, the chassis comprising:

- a back face;

- two side faces;

- a top;

- a bottom;

- two or more cavities formed into the chassis;

a front face, the front face comprising:
at least two rails;
at least two stiles, wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis; and
two or more modules mounted in two or more cavities, wherein each module performs a different function.

17. The vehicle of claim 16, wherein the functions performed by the two or more modules include a radio operation, a climate control operation, a multimedia display operation, a computing system operation, and a storage operation.

18. The vehicle of claim 17, further comprising:
a power bus mounted to the back face of the chassis;
a power connector mounted on the back face and configured to mate with a module and electrically connected to the power bus;
an input/output (I/O) bus mounted to the back face of the chassis; and
an I/O connector mounted on the back face, configured to mate with a module, and electrically connected to the I/O bus.

19. The vehicle of claim 18, further comprising:
at least one connection point on a front face of the chassis; and
at least one display devices mounted to the connection point, covering at least a portion of the front face of the chassis, and electrically connected to at least one module.

20. The vehicle of claim 19, wherein a portion of at least one module is exposed, wherein the portion provides at least on mechanical control to a user to provide input into a vehicle control system.

21. A vehicle console, comprising:
a head unit;
a chassis inserted into the head unit and mechanically attached to the head unit, the chassis comprising:

at least two rails;
at least two stiles; and
wherein the at least two rails and at least two stiles form at least two cavities in the chassis, wherein each cavity accepts a module.

22. The vehicle console of claim 21, further comprising: one or more modules inserted into a cavity.

23. The vehicle console of claim 22, wherein each cavity has common dimensions.

24. The vehicle console of claim 23, wherein each module has common dimensions.

25. The vehicle console of claim 24, wherein the chassis includes a power bus.

26. The vehicle console of claim 25, wherein each cavity includes a power connector configured to mate with a module and electrically connected to the power bus.

27. The vehicle console of claim 26, wherein the chassis includes an input/output (I/O) bus.

28. The vehicle console of claim 27, wherein each cavity includes an I/O connector configured to mate with a module and electrically connected to the I/O bus.

29. The vehicle console of claim 28, wherein the chassis further comprises at least one connection point on a front face of the chassis.

30. The vehicle console of claim 29, further comprising a display device mounted to the connection point and covering the front face of the chassis.

31. A chassis that mounts into a head unit of a vehicle, comprising:

a back face;

two side faces;

a top;

a bottom;

two or more cavities formed into the chassis;

a front face, the front face comprising:

at least two rails;

at least two stiles; and

wherein the at least two rails and at least two stiles form an opening to access the two or more cavities in the chassis, wherein each cavity accepts a module.

32. The chassis of claim 31, further comprising: one or more modules inserted into a cavity.

33. The chassis of claim 32, wherein each cavity has common dimensions, and wherein each module has common dimensions.

34. The chassis of claim 33, further comprising:

a power bus mounted to the back face of the chassis;

a power connector mounted on the back face and configured to mate with a module and electrically connected to the power bus;

an input/output (I/O) bus mounted to the back face of the chassis; and
an I/O connector mounted on the back face , configured to mate with a module,
and electrically connected to the I/O bus.

35. The chassis of claim 34, further comprising:
at least one connection point on a front face of the chassis; and
at least two display devices mounted to the connection point, covering the front
face of the chassis, and electrically connected to at least one module.

36. A vehicle comprising:
a vehicle console comprising:
a head unit;
a chassis mounted in the head unit, the chassis comprising:
a back face;
two side faces;
a top;
a bottom;
two or more cavities formed into the chassis;
a front face, the front face comprising:
at least two rails;
at least two stiles, wherein the at least two rails and at least
two stiles form an opening to access the two or more cavities in the chassis; and
two or more modules mounted in two or more cavities.

37. The vehicle of claim 36, wherein each cavity has common dimensions, and
wherein each module has common dimensions.

38. The vehicle of claim 37, further comprising:
a power bus mounted to the back face of the chassis;
a power connector mounted on the back face and configured to mate with a
module and electrically connected to the power bus;
an input/output (I/O) bus mounted to the back face of the chassis; and
an I/O connector mounted on the back face , configured to mate with a module,
and electrically connected to the I/O bus.

39. The vehicle of claim 38, further comprising:
at least one connection point on a front face of the chassis; and
at least one display devices mounted to the connection point, covering the front
face of the chassis, and electrically connected to at least one module.

40. The vehicle of claim 39, wherein a portion of at least one module is exposed, wherein the portion provides at least on mechanical control to a user to provide input into a vehicle control system.

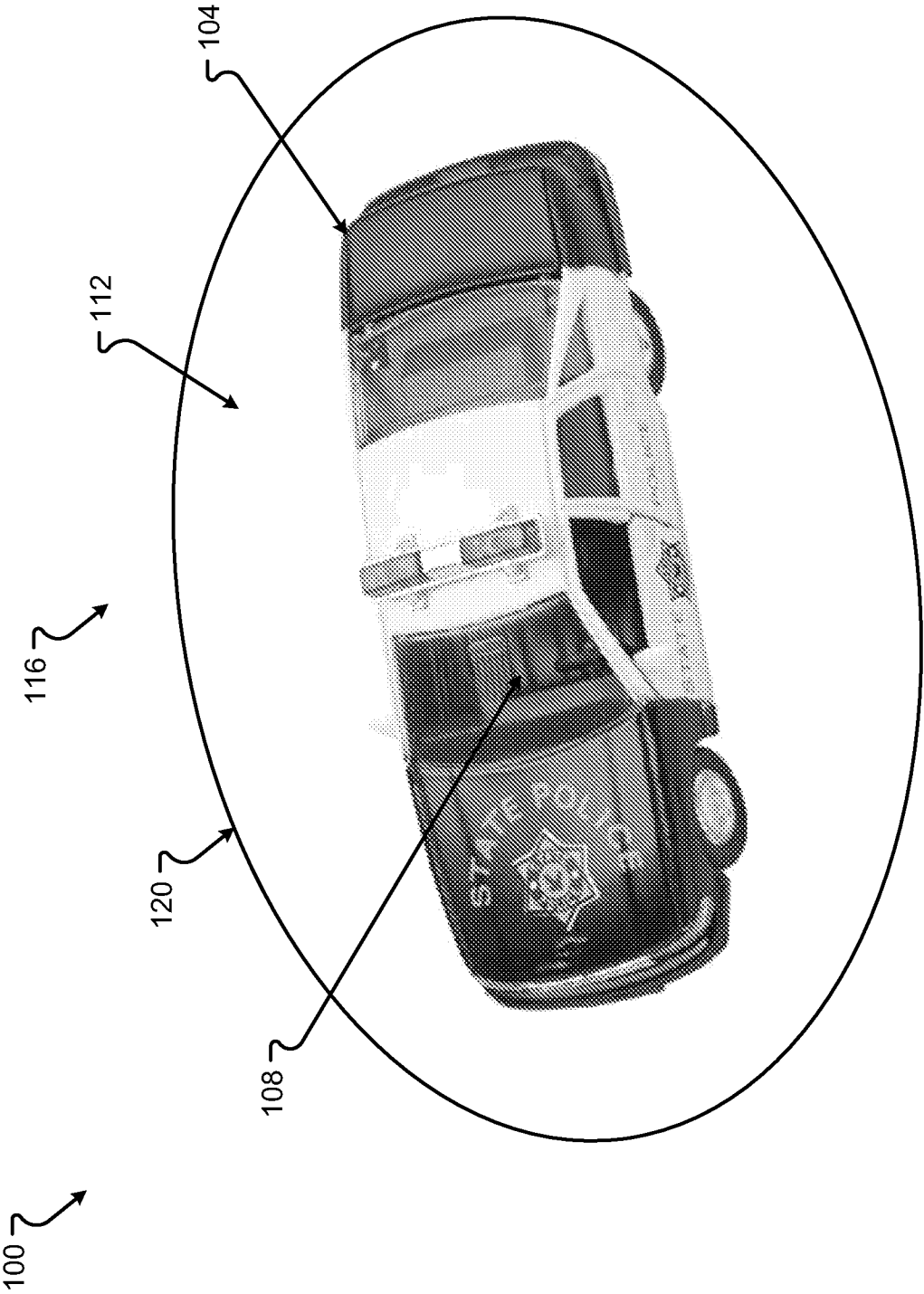


Fig. 1

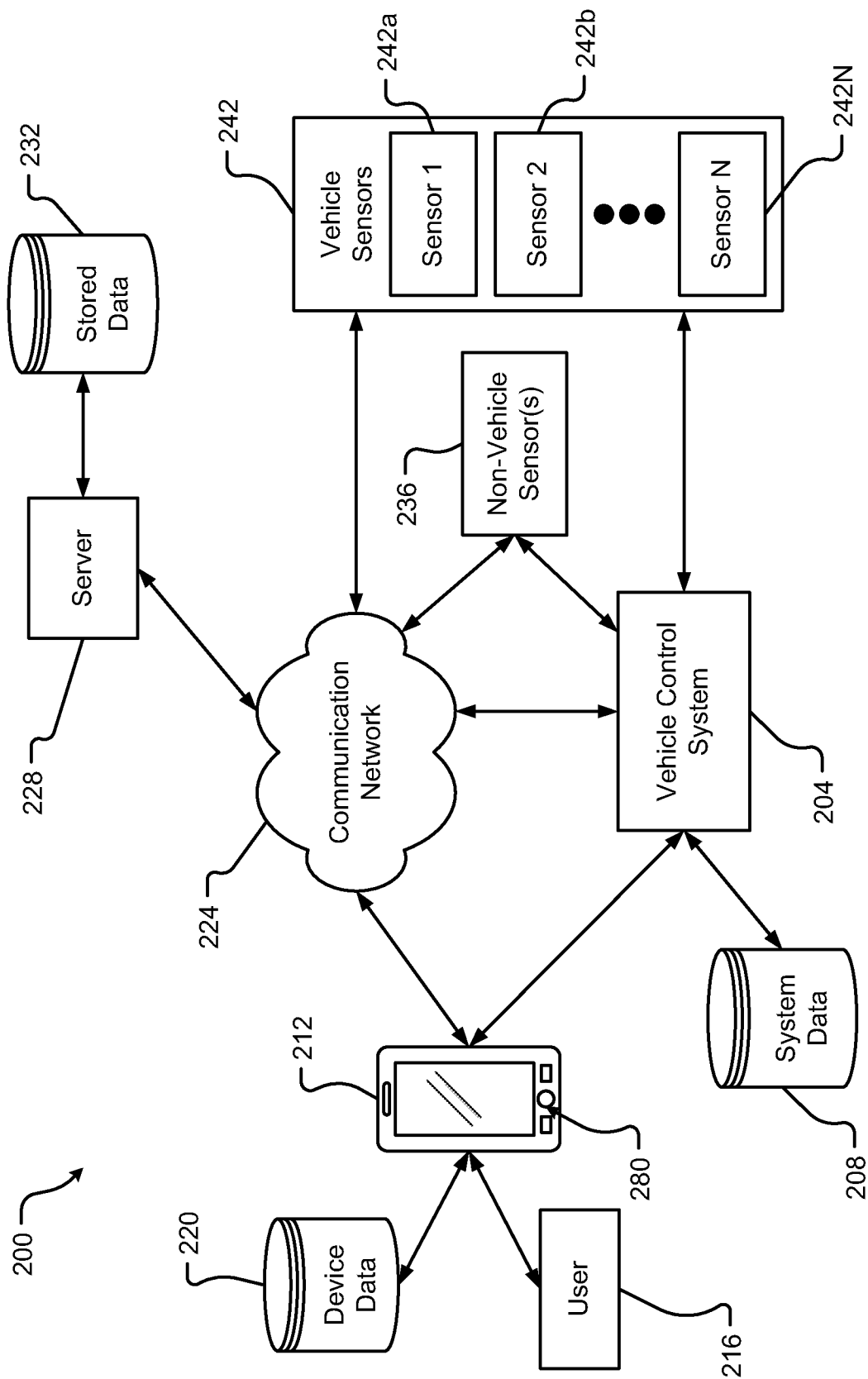


Fig. 2

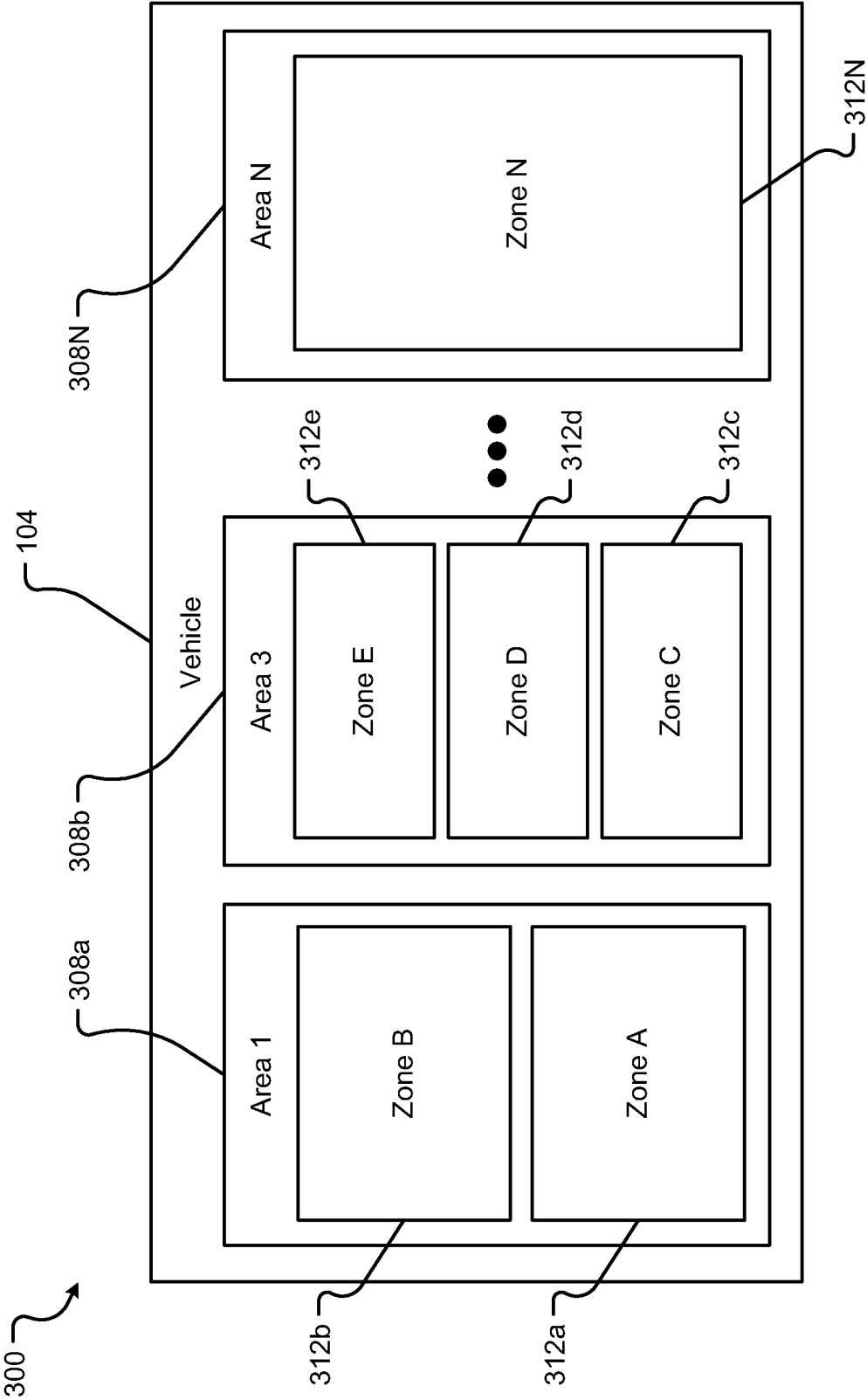


Fig. 3

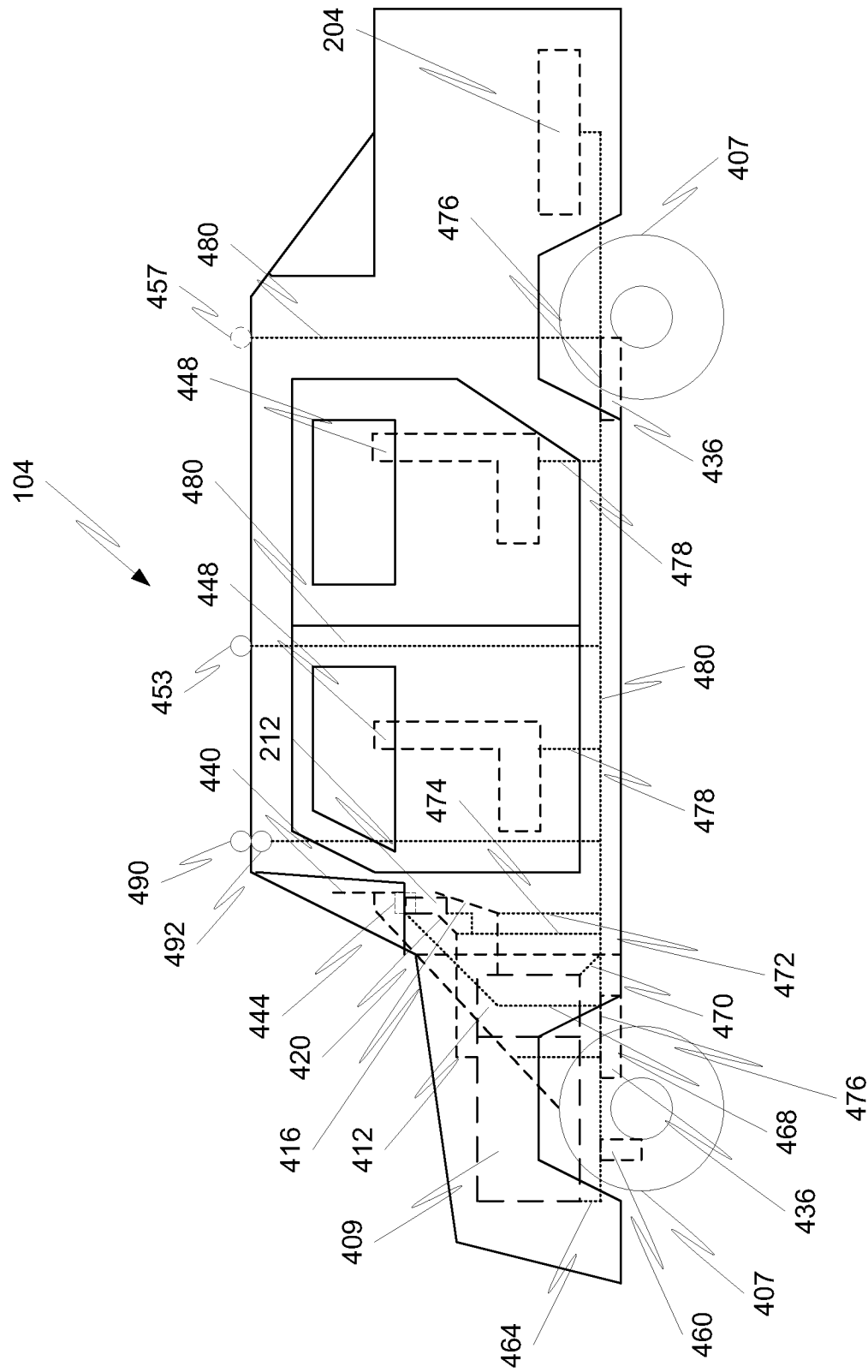
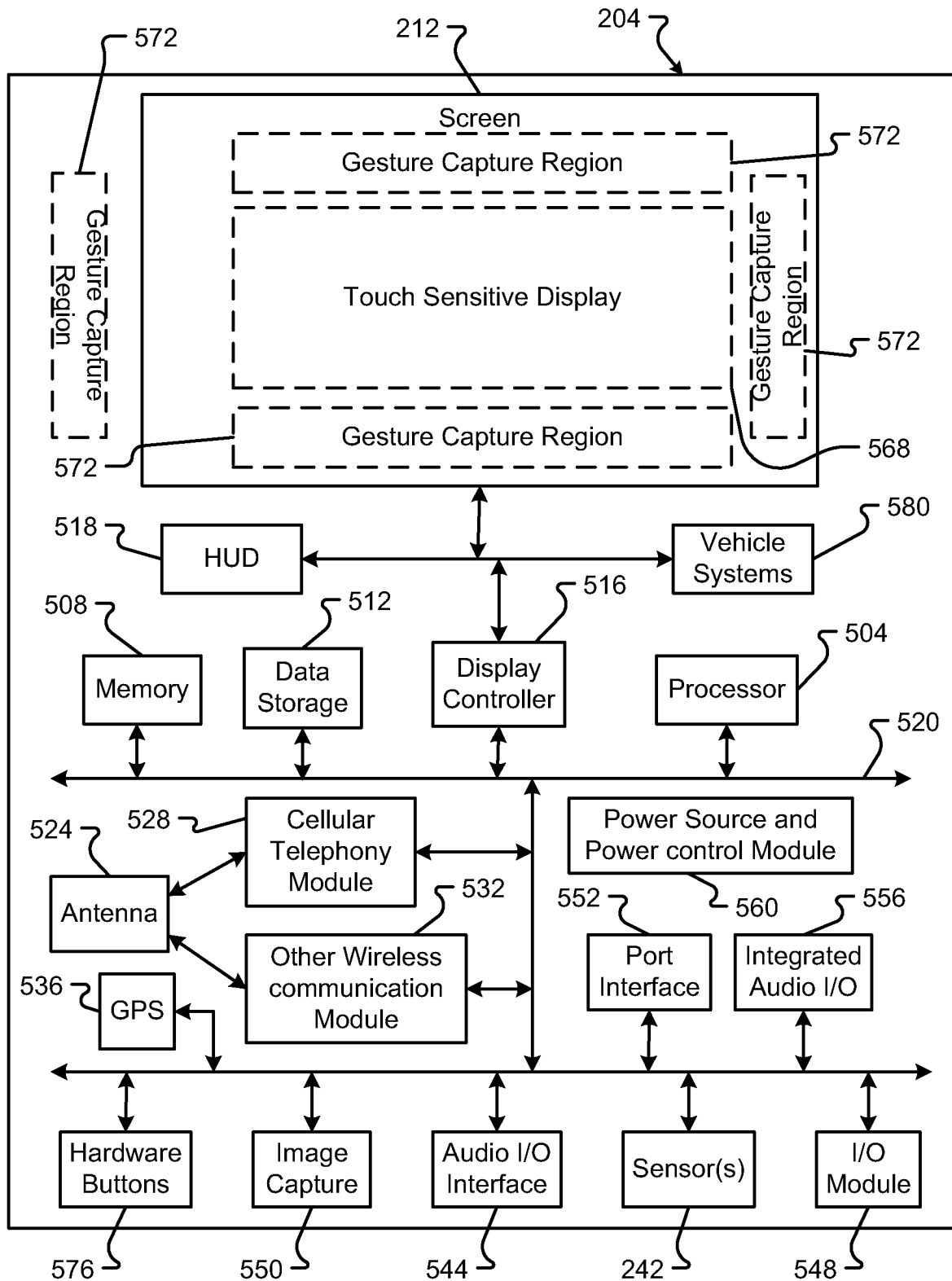


FIG. 4

**Fig. 5**

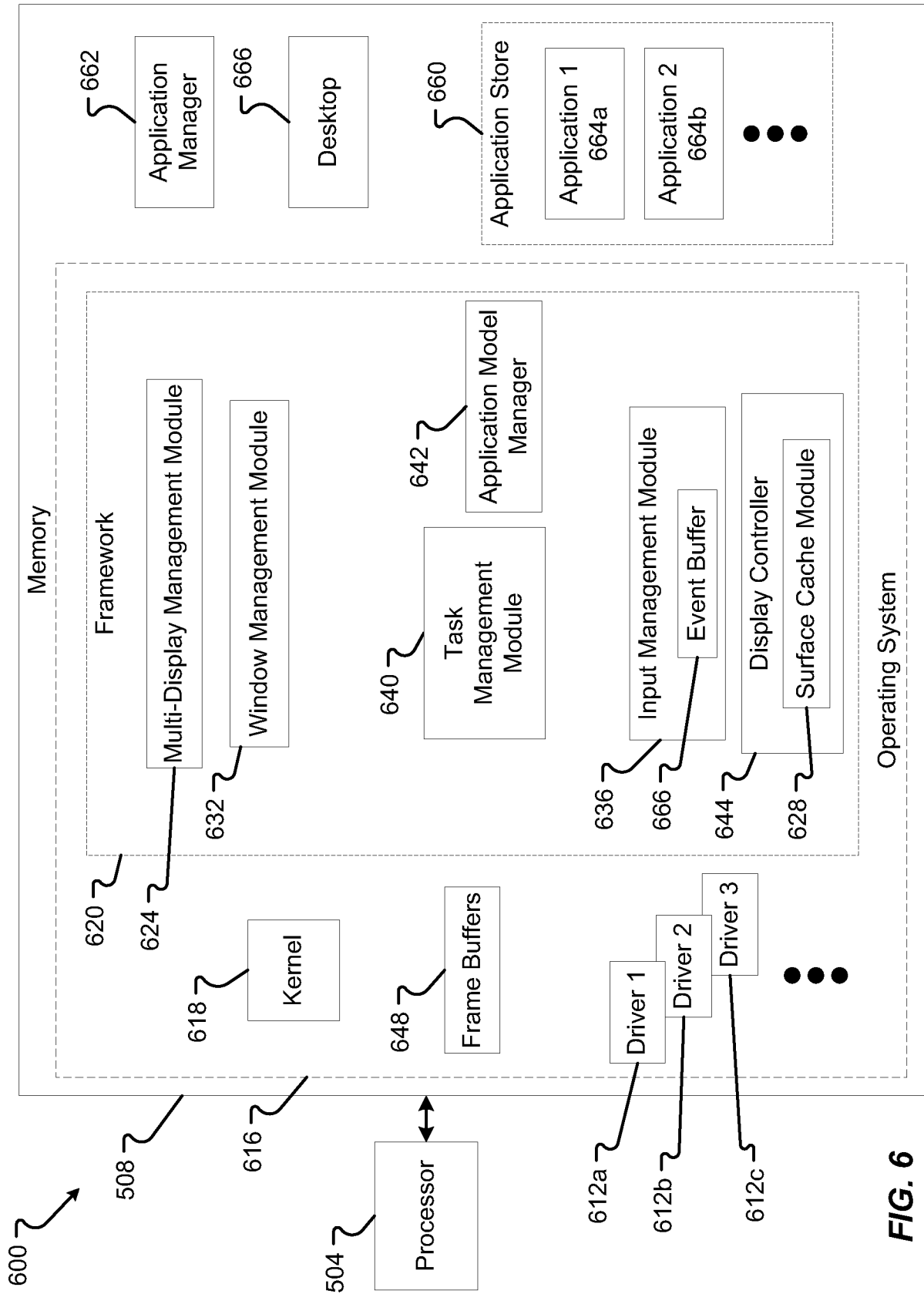


FIG. 6

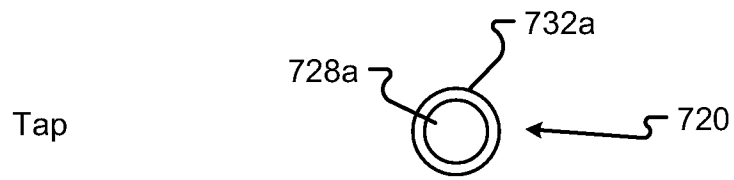


FIG. 7A

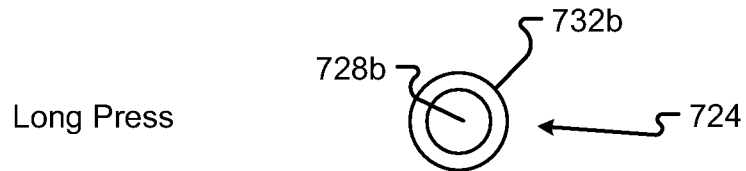


FIG. 7B

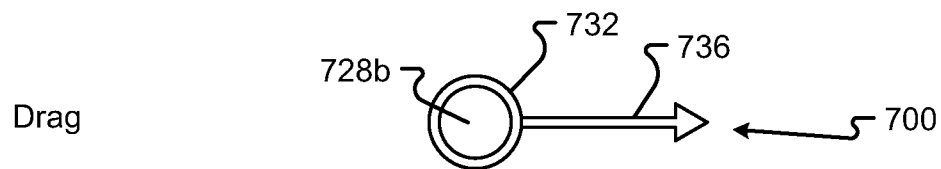


FIG. 7C

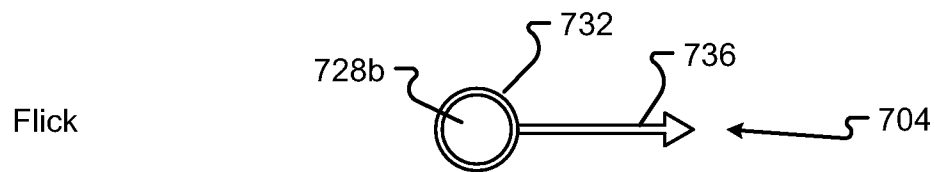


FIG. 7D

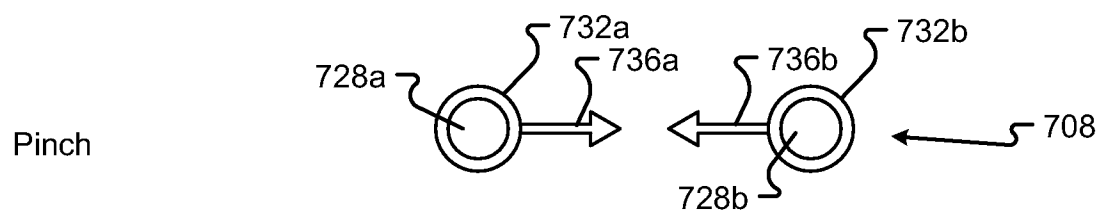


FIG. 7E

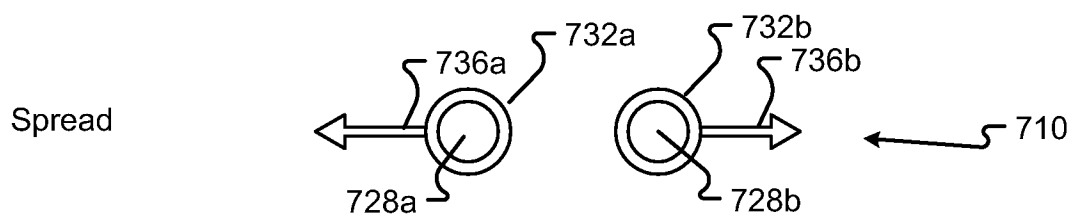


FIG. 7F

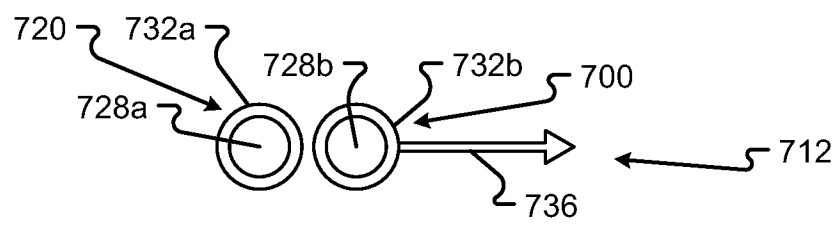


FIG. 7G

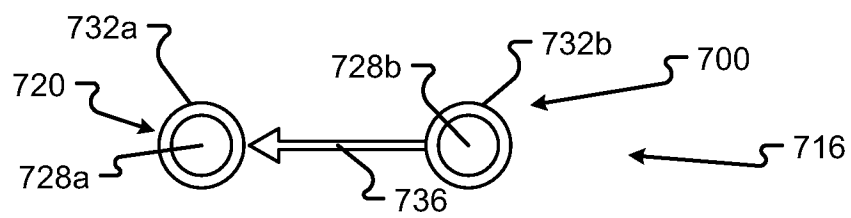


FIG. 7H

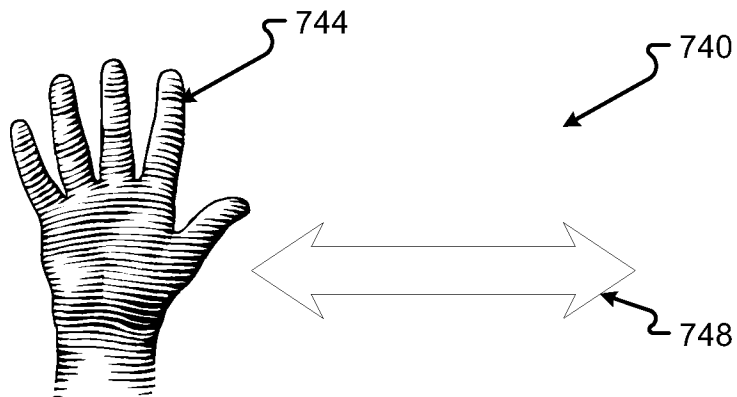


FIG. 7I

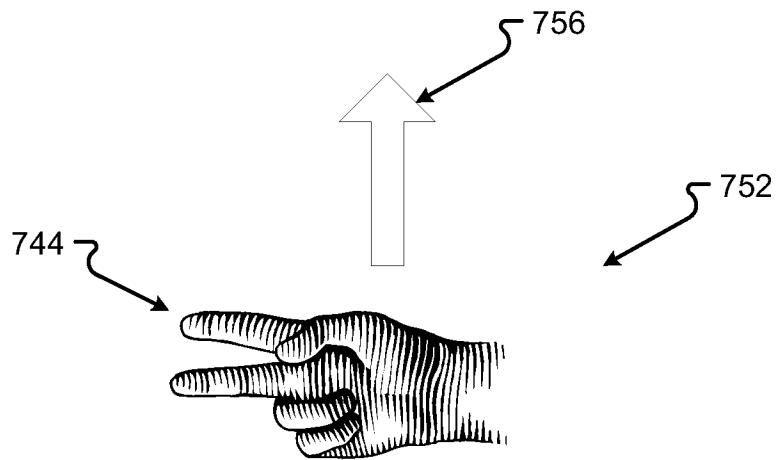


FIG. 7J

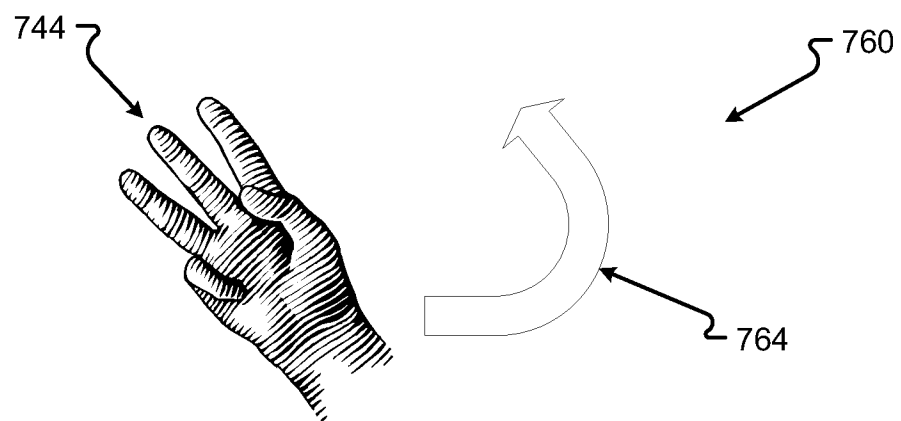


FIG. 7K

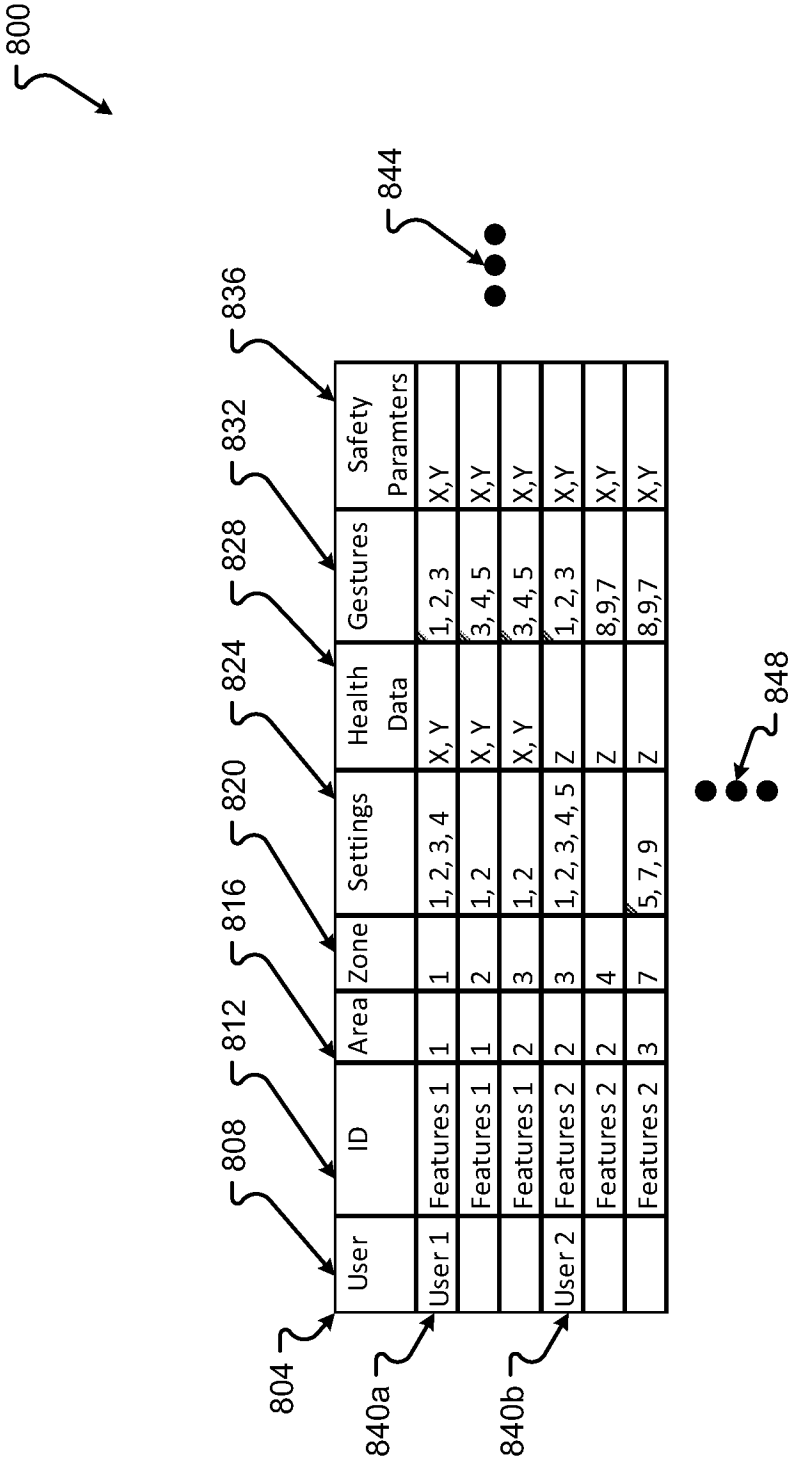
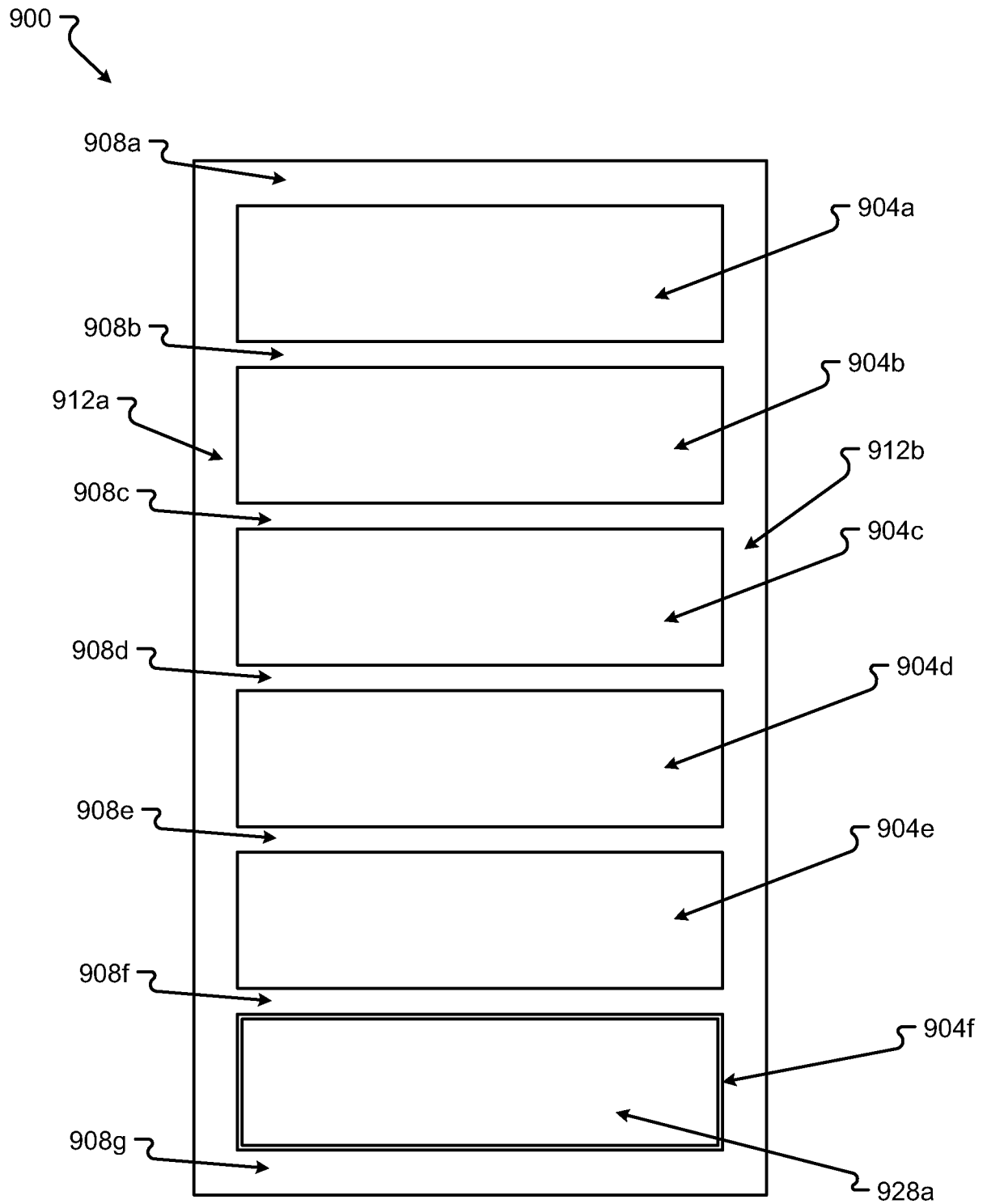


FIG. 8

**Fig. 9A**

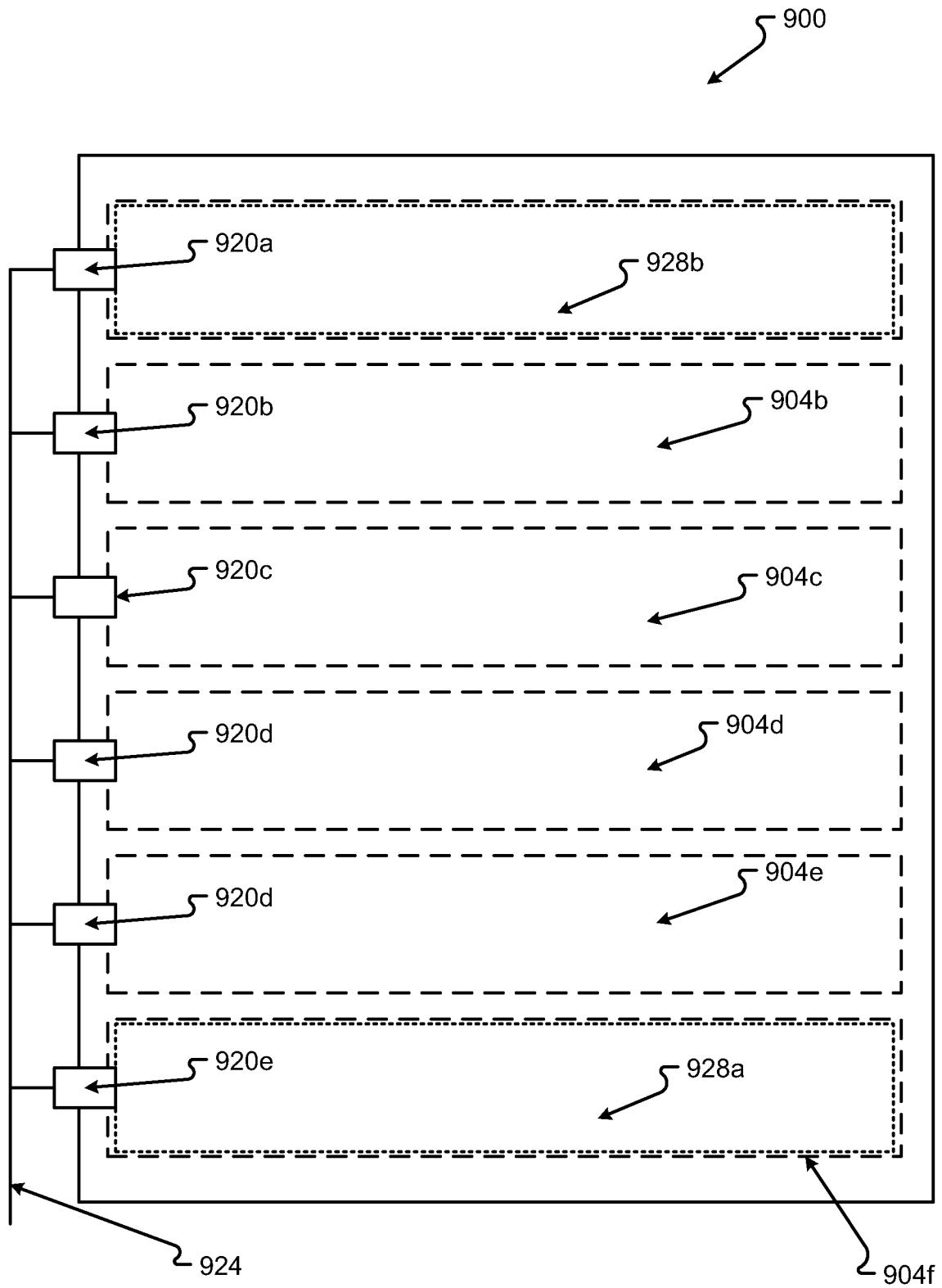
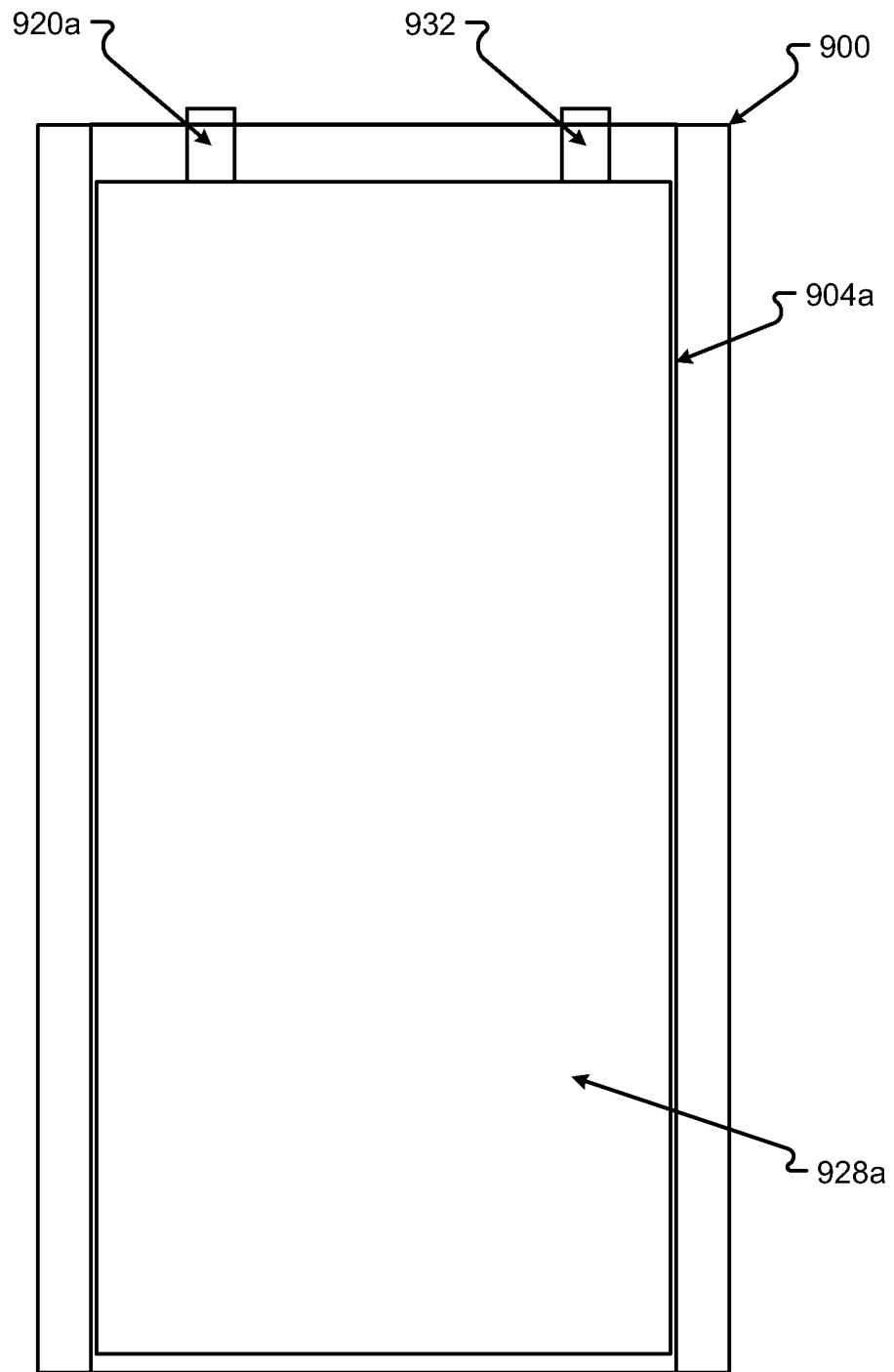


Fig. 9B

**Fig. 9C**

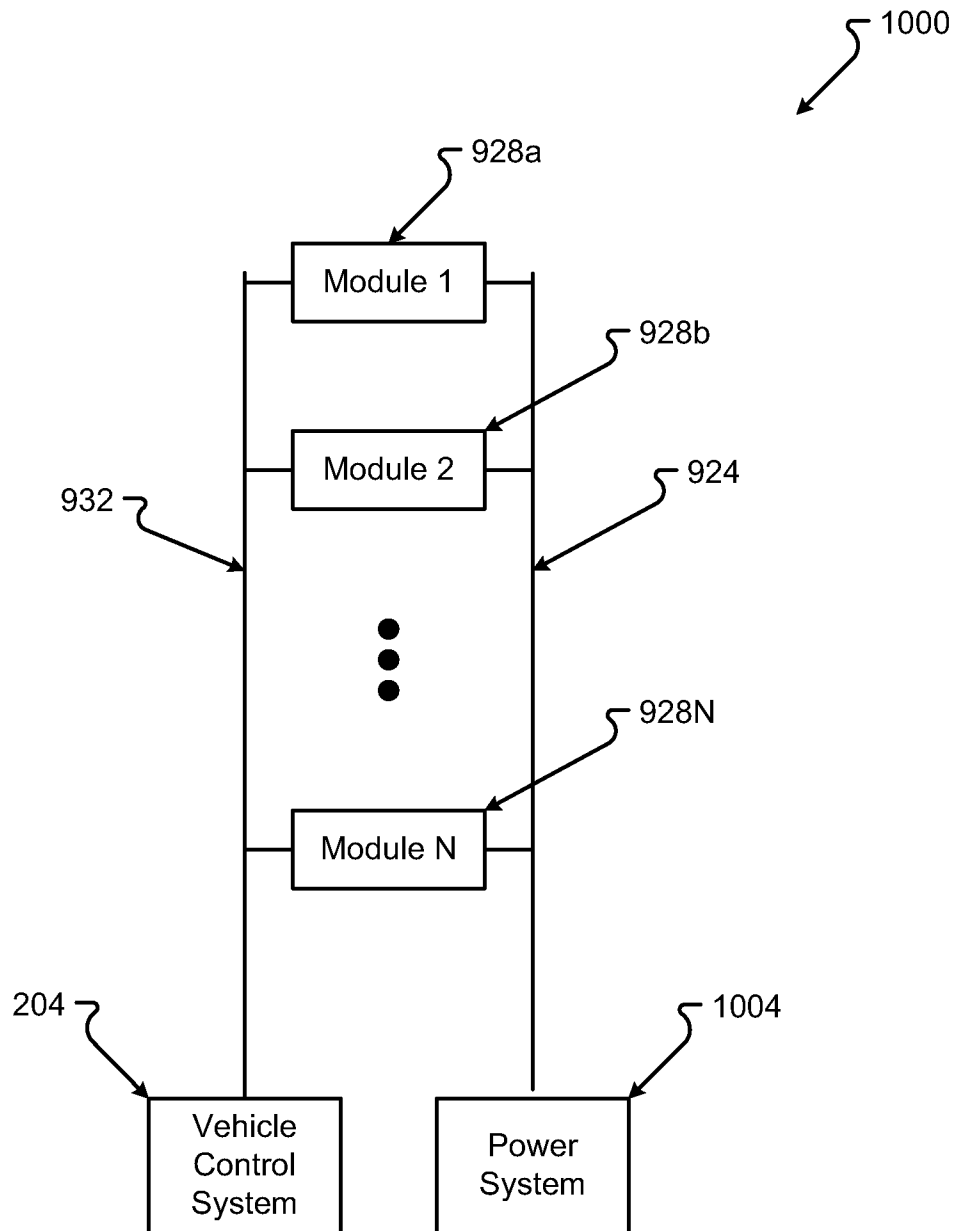


FIG. 10

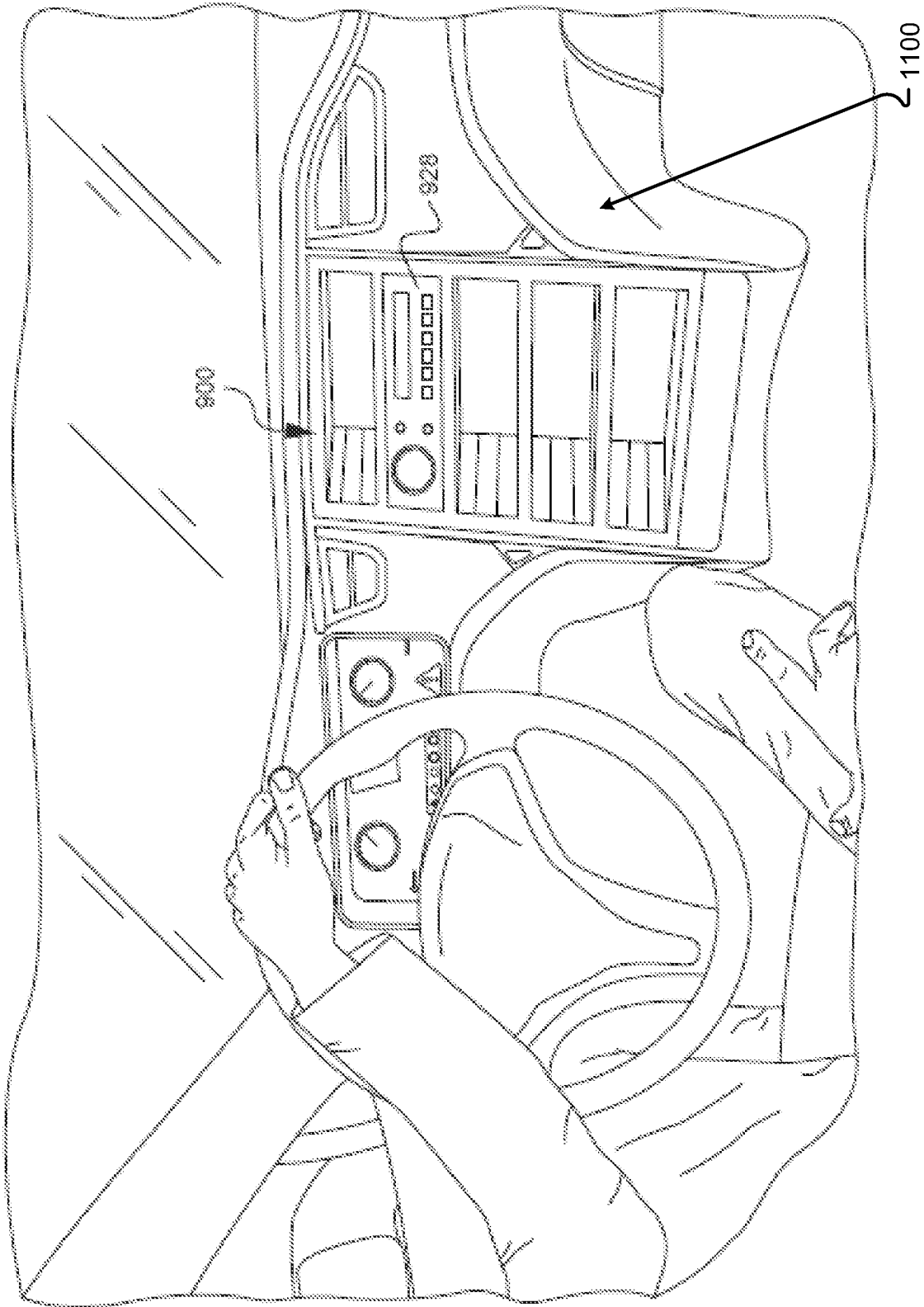


FIG. 11A

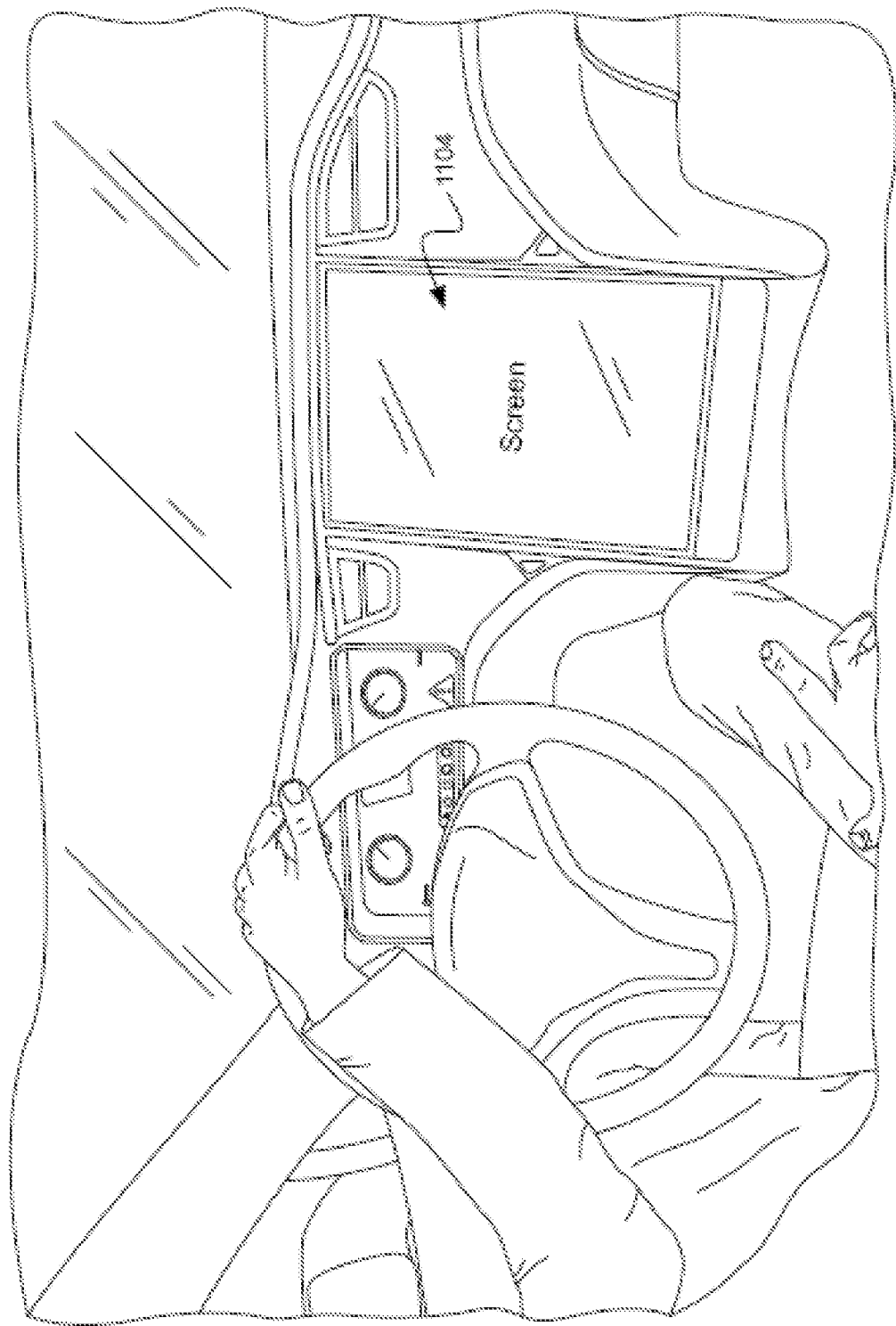


FIG. 11B

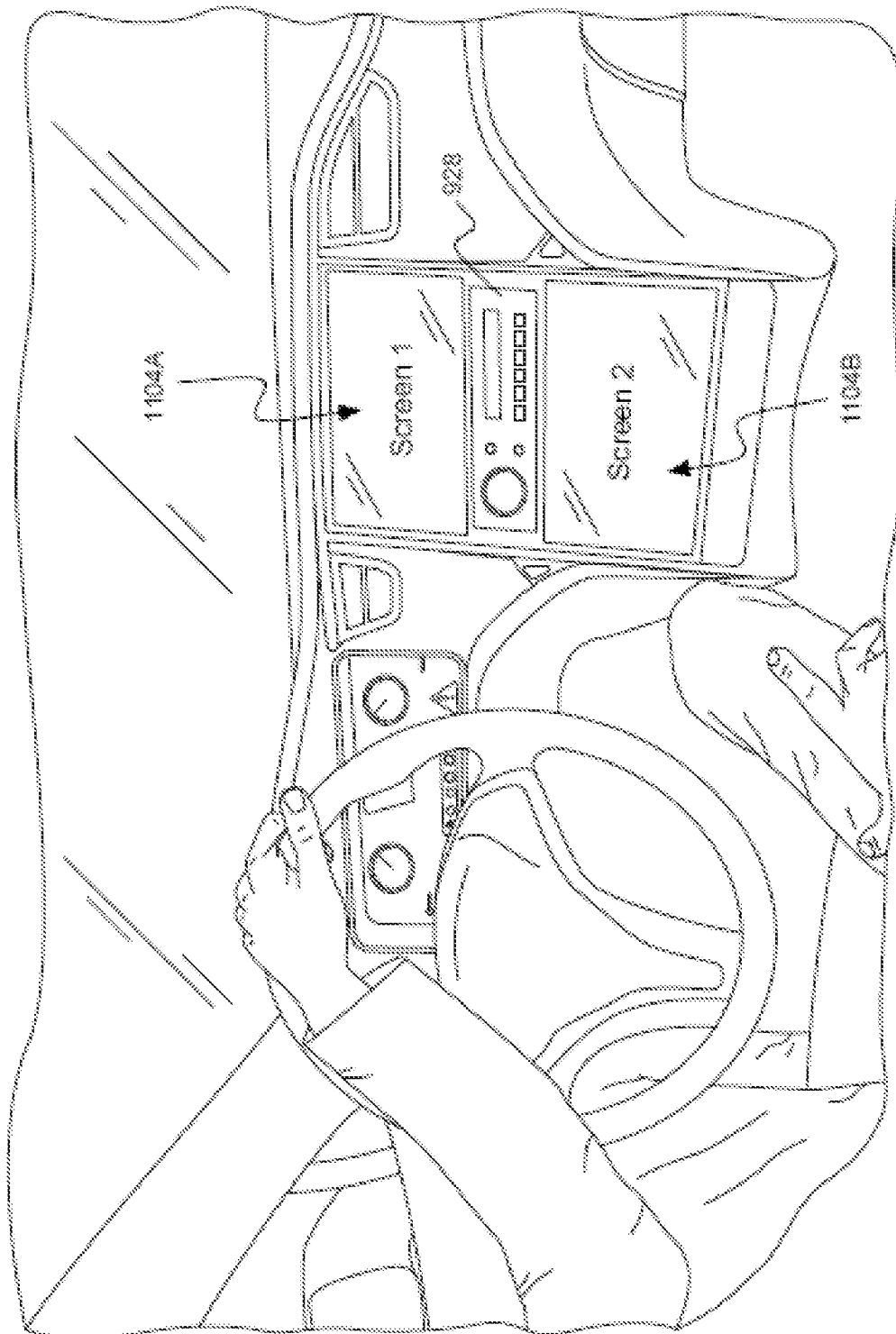


FIG. 11C

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/65642

A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - B60R 13/00 (2013.01) USPC - 296/24.34 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) IPC(8): B60R 13/00 (2013.01) USPC: 296/24.34 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched IPC(8): B60R 13/00 (2013.01) (keyword limited - see terms below) USPC: 296/24.34, 193.04 (keyword limited - see terms below) Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase; GooglePatents, GoogleScholar Search terms: console, dash, headboard, dashboard, cockpit, interior, car, vehicle, automobile, cavity, holder, module, electronic devices, bus, port, connector, display, screen, LCD, I/O, control																				
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X --- Y</td> <td>US 6,709,041 B1 (Hotary et al.) 23 March 2004 (23.03.2004) entire document, especially; Fig. 6a-c, 7-a-c; col. 2, ln 25-26; col. 4, ln 24 to col. 5, ln 9</td> <td>1-9, 11-14, 16-18, 21-29, 31-34, 36-38 ----- 10, 15, 19, 20, 30, 35, 39, 40</td> </tr> <tr> <td>Y</td> <td>US 7,543,871 B2 (Quigley et al.) 09 June 2009 (09.06.2009) entire document, especially; col. 2, ln 10-34</td> <td>10, 15, 19, 20, 30, 35, 39, 40</td> </tr> <tr> <td>X</td> <td>US 5,102,181 A (Pinkney) 07 April 1992 (07.04.1992) entire document</td> <td>1, 2, 21, 22</td> </tr> <tr> <td>A</td> <td>US 6,428,072 B1 (Moore) 06 August 2002 (06.08.2002) entire document</td> <td>1 - 40</td> </tr> <tr> <td>A</td> <td>US 2010/0090492 A1 (Carnevali) 15 April 2010 (15.04.2010) entire document</td> <td>1 - 40</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X --- Y	US 6,709,041 B1 (Hotary et al.) 23 March 2004 (23.03.2004) entire document, especially; Fig. 6a-c, 7-a-c; col. 2, ln 25-26; col. 4, ln 24 to col. 5, ln 9	1-9, 11-14, 16-18, 21-29, 31-34, 36-38 ----- 10, 15, 19, 20, 30, 35, 39, 40	Y	US 7,543,871 B2 (Quigley et al.) 09 June 2009 (09.06.2009) entire document, especially; col. 2, ln 10-34	10, 15, 19, 20, 30, 35, 39, 40	X	US 5,102,181 A (Pinkney) 07 April 1992 (07.04.1992) entire document	1, 2, 21, 22	A	US 6,428,072 B1 (Moore) 06 August 2002 (06.08.2002) entire document	1 - 40	A	US 2010/0090492 A1 (Carnevali) 15 April 2010 (15.04.2010) entire document	1 - 40
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X --- Y	US 6,709,041 B1 (Hotary et al.) 23 March 2004 (23.03.2004) entire document, especially; Fig. 6a-c, 7-a-c; col. 2, ln 25-26; col. 4, ln 24 to col. 5, ln 9	1-9, 11-14, 16-18, 21-29, 31-34, 36-38 ----- 10, 15, 19, 20, 30, 35, 39, 40																		
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☐ Further documents are listed in the continuation of Box C. ☐																				
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Date of the actual completion of the international search 03 February 2012 (03.02.2012)		Date of mailing of the international search report 28 FEB 2013																		
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201		Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774																		