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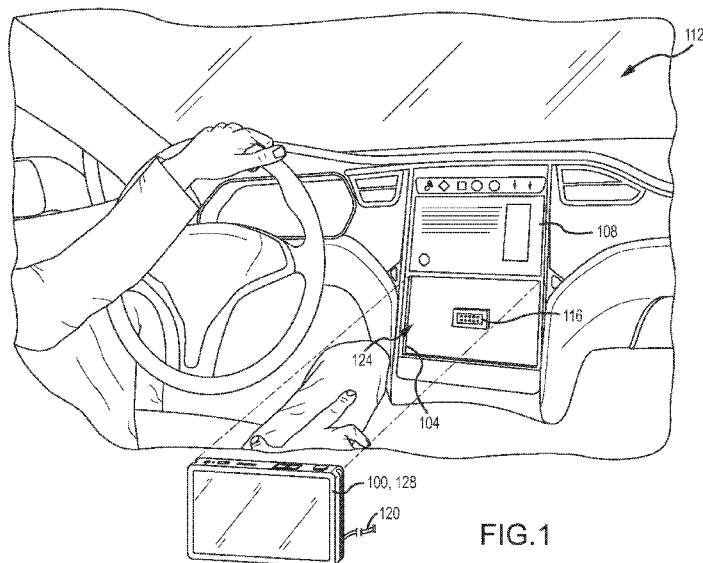


FIG. 1

(57) Abstract: Methods and systems for a configurable vehicle console are provided. Specifically, a configurable console may comprise one or more displays that are capable of receiving input from a user. At least one of these displays may be removed from the console of a vehicle and operated as a stand-alone computing platform. Moreover, it is anticipated that each one or more of the displays of the console may be configured to present a plurality of custom applications that, when manipulated by at least one user, are adapted to control functions associated with a vehicle and/or associated peripheral devices. Applications may be controlled via an application store from on board a vehicle.



## CONFIGURABLE VEHICLE CONSOLE

### 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 16, 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, entitled “Configurable Dash Display”; 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 “Gesture Recognition for On-Board Display” (Attorney Docket No. 6583-229); \_\_/\_\_, filed on November 16, 2012, entitled “Vehicle 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 “Control of Device Features Based on Vehicle State” (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. 6583-243); \_\_\_/\_\_\_,\_\_\_, 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 "Communications Based on Vehicle Diagnostics and Indications" (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.

[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, increasing 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 or place of comfort. 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, and in some cases Internet connectivity. 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.

### **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]** In embodiments, a method of configuring a vehicle control system graphical user interface (“GUI”) to display a plurality of vehicle applications, comprising: displaying, at a first time, a plurality of applications in a first presentation layout on at least a first GUI, wherein the plurality of applications are configured to communicate with at least one vehicle function associated with each application; receiving a first input at the at least a first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the at least a first GUI and the second presentation layout corresponds to a second position and behavior of each application different from the first presentation layout; selecting, by a processor, the second presentation layout to display on the at least a first GUI; sending, by a processor, a command to display the second presentation layout on the at least a first GUI; and displaying, at a second time, the second presentation layout on the at least a first GUI.

**[0008]** In embodiments, a method of configuring a vehicle control system graphical user interface (“GUI”) of a console device, comprising: detecting, by a processor, a first state of the console device, wherein the first state of the console device is one of attached to or removed from a vehicle-mounted position on a vehicle; storing, in memory, the first state of the console device and a first presentation layout associated with the first state; detecting, by a processor, a second state of the console device, wherein the second state of the console device is different from the first state of the console device, and wherein the second state of the console device is the other of attached to or removed from the vehicle-mounted position; and referring, by a processor, to stored rules to determine whether to change the first presentation layout of the console device based on the detected second state of the console device.

**[0009]** A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform the method comprising: displaying, at a first time, a plurality of applications in a first presentation layout on at least a first GUI, wherein the plurality of applications are configured to communicate with at least one vehicle function associated with each application; receiving a first input at the at least a first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the at least a first GUI and the second presentation layout corresponds to a second

position and behavior of each application different from the first presentation layout; selecting, by a processor, the second presentation layout to display on the at least a first GUI; sending, by a processor, a command to display the second presentation layout on the at least a first GUI; and displaying, at a second time, the second presentation layout on the at least a first GUI.

**[0010]** A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform the method comprising: detecting, by a processor, a first state of the console device, wherein the first state of the console device is one of attached to or removed from a vehicle-mounted position on a vehicle; storing, in memory, the first state of the console device and a first presentation layout associated with the first state; detecting, by a processor, a second state of the console device, wherein the second state of the console device is different from the first state of the console device; and referring, by a processor, to stored rules to determine whether to change the first presentation layout of the console device based on the detected second state of the console device.

**[0011]** A device for configuring a vehicle control system graphical user interface (“GUI”) to display a plurality of vehicle applications, comprising: a first GUI including a first display area; a first input gesture area of the first display; a vehicle signal input/output port, wherein the vehicle signal input/output port is configured to receive and send signals to and from a plurality of vehicle controls; a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform the method comprising: displaying, at a first time, a plurality of applications in a first presentation layout on the first GUI, wherein the plurality of applications are configured to communicate with vehicle functions that are associated with each application; receiving a first input at the first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the first GUI and the second presentation layout corresponds to a second position and behavior of each application different from the first presentation layout; selecting, by a processor, the second presentation layout to display on the first GUI; sending, by a processor, a command to display the second presentation layout on the first GUI; and displaying, at a second time, the second presentation layout on the first GUI.

[0012] A removable, configurable console device for displaying and interacting with a plurality of user-controllable vehicle applications, comprising: a first graphical user interface (“GUI”) including a touch sensitive display; an input/output port, wherein the input/output port is configured to send and receive signals between the console device and a plurality of devices associated with a vehicle; at least one engagement feature, wherein the at least one engagement feature is configured to selectively connect the console device to a vehicle-mounted position on the vehicle; and a switch element configured to detect a state of the console device, wherein the state of the console device is one of attached to or removed from the vehicle-mounted position.

[0013] In an embodiment, a microprocessor executable application manager performs, or causes to be performed, the following steps/operations:

[0014] (a) providing a vehicle operator with an application store, the application store comprising information relating to a plurality of applications available for installation on a vehicle computer;

[0015] (b) receiving, from the vehicle operator, a request to install at least one of the plurality of applications; and

[0016] (c) installing the selected at least one of the plurality of applications in an electronic readable memory of the vehicle.

[0017] In one configuration, the application manager configures the application store based on one or more of vehicle state, configuration, and/or operation. Configuring can include one or more of the following:

[0018] (i) determining a relative ranking of each of the plurality of applications;

[0019] (ii) determining which applications are to be included in the plurality of applications; and

[0020] (iii) enabling and/or disabling one or more features and/or functions of the application store.

[0021] Vehicle state, configuration, and/or operation can be determined based on one or types of sensed information received from one or more vehicle sensors. Examples of sensed information include one or more of the following: wheel state, vehicle speed, acceleration, deceleration, wheel rotation, wheel speed, wheel slip, power source energy output, engine speed, energy input and/or output, turbine speed, input speed, crankshaft position, manifold absolute pressure, mass flow, switch state, a transmission setting, a gear control current setting, a setting of a power controller, a state of a braking system, a seat setting, a weight and/or identity of seated occupant, exterior sound levels, interior sound

levels, safety system state, light setting, brake control setting, accelerator pedal setting or angle, clutch pedal setting, emergency brake pedal setting, door setting, engine temperature, passenger compartment or cabin temperature sensor, window setting, imaging output, odometer reading, trip mileage reading, wind speed, radar transmitter/receiver output, brake wear, steering/torque, oxygen level, ambient lighting, ranging sensor output, parking sensor output, heating, venting, and air conditioning (HVAC) sensor output, water sensor output, air-fuel ratio meter output, blind spot monitor output, hall effect sensor output, radio frequency (RF) sensor output, infrared (IR) sensor output, vehicle control system sensor output, wireless network sensor output, vehicle location, vehicle direction of travel, and cellular data sensor output

**[0022]** Examples of applications accessible by the application store include applications directed to one or more of the following: vehicle control applications, applications associated with at least one vehicle task, function, and/or operation, applications related to handicap and accessibility graphical user interfaces, email clients, web browsers, communications applications, games, entertainment applications, satellite positioning system receiver applications, automotive navigation applications or devices (which can, for instance, provide pre-set destinations, live traffic information, gas prices along the route, and point-of-interest information, map applications, medical information applications, emergency service applications, noise suppression applications, news-related applications, vehicle manual related applications, weather information-related applications, biometric applications, travel applications, speech recognition applications such as to provide hands-free voice control of other applications, applications to read to the operator Really Simple Syndication (“RSS”) feeds, Twitter messages, email messages, and/or instant messages, social networking applications, streaming media applications, and utility applications (e.g., wall paper displayed by console, screen saver displayed by console, configurable parameters, and the like).

**[0023]** In a configuration, the application store configuration is based on observed behavior of the vehicle operator and/or behaviors of operators of other vehicles.

**[0024]** In a configuration, the application store configuration is based on one or more of a type, make, model and/or year of manufacture of the vehicle.

**[0025]** In a configuration, the application store configuration is based on one or more of whether a communication device, separate from the vehicle, is docked or otherwise in signal communication with the application manager and a configuration of and/or applications stored on and executable by the communication device. The application

manager can change, or cause to be changed, license restrictions or permissions to enable one or more of the applications stored on the communication device to execute on a processor on-board the vehicle.

**[0026]** The present disclosure can provide a number of advantages depending on the particular aspect, embodiment, and/or configuration. Currently, vehicle consoles are known to include physical and/or electrical controls for the manipulation of certain vehicle features. For example, vehicles may include climate control, audio control, and other preferences available from a main console. The adjustment of these controls may be achieved through physical and/or touch-screen manipulation of dials, knobs, switches, keys, buttons, and the like. However, the custom configurability of these controls is limited on current touch-screen consoles and virtually impossible on physical consoles. Moreover, both touch-screen and physical consoles remain permanently hard-wired to the vehicle.

**[0027]** In one embodiment of the present disclosure a removable console is described. Specifically, the present disclosure is directed to a console that can be simply and repeatably detached from and reattached to a specific location. In some cases, a console of a vehicle may span across, or be separated into, one or more individual screens. The present disclosure anticipates detaching at least one of these console screens. This detachable console screen may have its own processor, memory, and power source. Furthermore, the detachable console screen may be operated as a tablet or portable computing platform. Alternatively, the device may be tethered to the vehicle for use inside a predefined area.

**[0028]** In some embodiments, the removable console may interface with the vehicle, and/or other consoles, via an attachment point. The attachment point may include an electrical interface and a locking feature. This locking feature may allow removal and/or prevent removal of the detachable console based on specific rules. Furthermore, the locking feature may be configured to provide a rest portion where the detachable console may reside during a connected operation with the vehicle.

**[0029]** It is one aspect of the present disclosure the removable console may provide its location to the vehicle and/or other associated device. For instance, if the removable console is removed from an area adjacent to the vehicle, an alert may indicate its removal from the predefined area. This alert may be sent to a mobile device (e.g., text message). Additionally, the alert may be an audible and/or visual alert to those adjacent to the vehicle. Moreover, the removable console may provide a signal that can be analyzed to

determine location. This signal may be continuously and/or selectively sent according to specific rules.

**[0030]** In another embodiment of the present disclosure, a configurable console is shown to incorporate various features and controls that may be selectively configured by an application, user, software, hardware, various input, and the like. Configuration may include adjustments to at least one of the size, location, available features, functions, applications, modules, and behavior of the configurable console. It is one aspect of the present disclosure to allow for the integration of custom designed templates of standard console layouts that users may manipulate and/or modify. These modifications may be saved and stored.

**[0031]** Further, certain controls and/or features may be selected to display in any given position on the console. For example, if a user wishes to have constant access to the climate-control settings of a vehicle, the user may place a “climate-control” module on the configurable console. The position and/or features of this module may be adjusted according to rules and its position may be arranged as desired by the user. It is anticipated that recommended positions for the module, or modules, could be provided by the vehicle console system. If a user wishes to add a “music control” module to the console the user can similarly select position, size, and/or other features associated with the module to best suit the user’s needs. A user may access a respective or selected console display configuration from among a plurality of different console display configurations by inputting a code or identifier. The result is that different users of a common vehicle or common make, year, and model can have differently configured console displays.

**[0032]** In some embodiments, these modules may be programmed to disappear, dim, or exhibit other functions in response to some type of stimulus. For example, the user may want one or more control modules to dim upon driving. Alternatively, the user may want one or more modules to disappear according to a timer or other stimulus. It is anticipated that the stimulus may include user input, timers, sensors, programmed conditions, and the like.

**[0033]** For example, in the event of an accident, access to a vehicle’s music, climate control and/or other non-essential modules is of little benefit. In an emergency scenario, the console may use one or more sensors, possibly including vehicle sensor (e.g., air bag sensor, gyroscope, or accelerometer), to detect the accident and provide emergency features to a user via the console. These features may replace the standard modules arranged on the console (e.g., the music and climate modules are minimized or removed,

replaced by one or more emergency modules). A large “hazard” light module may be created. Additionally or alternatively, an emergency contact module may be provided to allow the user easy access to an emergency communication channel. Contacting the emergency channel could be left to the discretion of the user. As can be appreciated by one skilled in the art, these emergency modules may automatically contact an emergency channel and/or use timers and other sensors to determine whether to initiate contact with the emergency channel.

**[0034]** In accordance with the present disclosure, it is anticipated that the vehicle may use sensors in an individual’s phone or other device to detect a specific user’s heartbeat and/or monitor a user’s other vital signs. These vital signs could be relayed to an emergency contact to aid in possible treatment and/or evaluate a necessary emergency response. Using a phone’s, or other device’s, gyroscope and/or accelerometer to detect a user’s heartbeat could be achieved via storing conditions at a time prior to an accident and comparing the stored conditions to those obtained during the emergency. In the event that a user has associated his or her phone and/or device with the vehicle console, this process of monitoring, sending, and using the vital sign information could be achieved automatically by the console and/or vehicle. These and other advantages will be apparent from the disclosure.

**[0035]** 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.

**[0036]** The term “a” or “an” entity 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.

**[0037]** 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.”

**[0038]** 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.

**[0039]** The term “desktop” 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.

**[0040]** The term “display” refers to a portion of a screen used to display the output of a computer to a user.

**[0041]** The term “displayed image” 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.

**[0042]** The term “display orientation” 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.

**[0043]** The term “gesture” 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.

**[0044]** 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.

**[0045]** The term “gesture capture” 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.

**[0046]** A “multi-screen application” 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.

**[0047]** A “single-screen application” refers to an application that is capable of producing one or more windows that may occupy only a single screen at a time.

**[0048]** The term “screen,” “touch screen,” or “touchscreen” 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.

**[0049]** 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.

**[0050]** 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.

**[0051]** 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.

**[0052]** 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.

[0053] 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**

[0054] Fig. 1 depicts a device of a configurable vehicle console removably detached from a mounting location of a vehicle in accordance with one embodiment of the present disclosure;

[0055] Fig. 2A depicts a front perspective view of a configurable vehicle console in accordance with one embodiment of the present disclosure;

[0056] Fig. 2B depicts a rear perspective view of a configurable vehicle console in accordance with one embodiment of the present disclosure;

[0057] Fig. 3 is a block diagram of an embodiment of the hardware of the device;

[0058] Fig. 4 is a block diagram of an embodiment of the device software and/or firmware;

[0059] Fig. 5A depicts a first representation of a graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;

[0060] Fig. 5B depicts a second representation of a graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;

[0061] Fig. 5C depicts a third representation of a graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;

[0062] Fig. 5D depicts a fourth representation of a graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;

- [0063] Fig. 5E depicts a fifth representation of a graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;
- [0064] Fig. 6A depicts a sixth representation of a graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;
- [0065] Fig. 6B depicts a seventh graphical user interface of a configurable vehicle console in accordance with one embodiment of the present disclosure;
- [0066] Fig. 7 is a flow diagram depicting a configurable vehicle console method in accordance with embodiments of the present disclosure;
- [0067] Fig. 8 is a flow diagram depicting a configurable vehicle console method in accordance with embodiments of the present disclosure;
- [0068] Fig. 9 is a flow diagram depicting a removable, configurable vehicle console method in accordance with embodiments of the present disclosure;
- [0069] Fig. 10 is a flow diagram depicting a removable, configurable vehicle console method in accordance with embodiments of the present disclosure;
- [0070] Fig. 11 depicts a representation of an application store in the configurable graphical user interface according to an embodiment;
- [0071] Fig. 12 depicts a vehicle configured in accordance with an embodiment of the present disclosure;
- [0072] Fig. 13 depicts a representation of an application store in the configurable graphical user interface according to an embodiment; and
- [0073] Figs. 14A and 14B are flow diagrams depicting a method according to an embodiment.
- [0074] 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

[0075] Presented herein are embodiments of a device. The device can comprise single devices or a compilation of devices. Furthermore, the device can be a communications device, such as a cellular telephone, or other smart device. This device, or 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.

[0076] Fig. 1 depicts a device of a configurable vehicle console removably detached from a mounting location of a vehicle in accordance with one embodiment of the present disclosure. In some embodiments, the configurable vehicle console may comprise at least one device 100 that is capable of being attached to a vehicle in a vehicle-mounted position 124. Further, the device 100 may engage with the vehicle via one or more of engagement feature 212 (Figs. 2A and 2B), vehicle mount 104, vehicle dock 116, and combinations thereof. In embodiments, the configurable vehicle console may consist of the device 100 and at least one additional console display 108. Moreover, the device 100 may be tethered to the vehicle-mount position via an optional tether 120. As can be appreciated, the tether 120 may carry electrical and/or optical signals for the purposes of power and communication. The tether 120 may be connected between the device 100 and the vehicle interior 112, and even connect to the dock 116. In some embodiments, the tether 120 may be used to limit movement of the device 100, especially acting such that the device 100 may not be removed from the vehicle interior 112. Further, the tether 120 may be constructed from a material, or combination of materials, that allow the device 100 to be repeatably attached and detached from the vehicle-mounted position 124. In an alternative embodiment, the tether 120 may be constructed such that no signal, power or otherwise, is passed from the device 100 to the vehicle.

[0077] It is anticipated that the device 100 may communicate with, and/or be operated independently of, the additional console display 108. Communication between the device 100 and the additional console display 108 may be achieved through physical and/or wireless methods. It is one aspect of the present disclosure that the device 100 when removed from the vehicle-mounted position 124 may be operated as a stand-alone computing device 128, such as a tablet computer. This stand-alone computing device 128 may also display and behave as a tablet computer configured as, but in no way limited to, email clients, web browsers, texting applications, games, media players, office suites, etc. In embodiments, applications that have been designated as “essential” may either remain on the display of the stand-alone computing device 128 or upon removal be transferred to

the additional console display 108. This transfer of the essential applications may be initiated by a manually selected option. Alternatively, the transfer of essential applications may be initiated automatically when the device 100 is removed from the vehicle-mounted position 124. One or more of a number of sensors, the mount 104, the dock 116, other features of the device 100, and combinations thereof may be used to determine removal of the device 100 from the vehicle-mounted position 124.

[0078] Figs. 2A and 2B illustrate a device in accordance with embodiments of the present disclosure. The configurable vehicle console can include a number of devices that work together with at least one process of a vehicle to provide various input/output functions. One such device 100 includes a touch sensitive front screen 204. In some embodiments, the entire front surface of the front screen 204 may be touch sensitive and capable of receiving input by a user touching the front surface of the front screen 204. The front screen 204 includes touch sensitive display 208, which, in addition to being touch sensitive, also displays information to a user. In other embodiments, the screen 204 may include more than one display area.

[0079] It is anticipated that the device 100 may comprise a dual-screen phone and/or smartpad as described in respective U.S. Patent Application Nos. 13/222,921, filed August 31, 2011, entitled “DESKTOP REVEAL EXPANSION,” and 13/247,581, filed September 28, 2011, entitled “SMARTPAD ORIENTATION.” Each of the aforementioned documents is incorporated herein by this reference in their entirety for all that they teach and for all purposes.

[0080] In addition to touch sensing, front screen 204 may also include areas that receive input from a user without requiring the user to touch the display area of the screen. For example, the front screen 204 may be configured to display content to the touch sensitive display 208, while at least one other area may be configured to receive touch input via a gesture capture area 206. The front screen 204 includes at least one gesture capture area 206. This at least one gesture capture area 206 is able to receive input by recognizing gestures made by a user touching the gesture capture area surface of the front screen 204. In comparison to the touch sensitive display 208, the gesture capture area 206 is commonly not capable of rendering a displayed image.

[0081] Also shown in Figs. 2A and 2B is at least one engagement feature 212 that is configured to facilitate the removable attachment and detachment of the device 100 from a vehicle-mounted position. The vehicle-mounted position refers to the location of the device 100 when it is attached to the vehicle console, the vehicle, and/or vehicle

accessory. Although still capable of operating as a configurable vehicle console when detached, the vehicle-mounted position allows the device 100 to operate in a state that may differ from another state when the device 100 is detached. The engagement feature 212 may employ the use of grooves, catches, hollows, clasps, tab and slot, protrusions, bosses, combinations thereof, and/or other mechanical or electromechanical features to enable attachment to a vehicle-mounted position. It is anticipated that the engagement feature 212 will further provide for the secure mounting to a vehicle and/or accessory while also providing access to the quick removal of the device 100 from its vehicle-mounted position.

**[0082]** In some embodiments, the device 100 may include one or more physical and/or electrical features such as switches, buttons, ports, slots, inputs, outputs, and the like. These features may be located on one or more surfaces 230 of the console 100. In embodiments, several of these features may be accessed when detached from a default vehicle-mounted location. In other words, it is an aspect of the present disclosure to locate one or more of these features on a surface of the device 100 that remains hidden when attached.

**[0083]** Figs. 2A and 2B show a top side 230 of the console 100. As shown, the top side 230 of the device 100 in one embodiment may include a plurality of control buttons 280, which can be configured for specific inputs and, in response to receiving an input, may provide one or more electrical signals to a specific input pin of a processor or Integrated Circuit (IC) in the device 100. For example, control buttons 216, 220, and 224 may be configured to, in combination or alone, control a number of aspects of the device 100. Some non-limiting examples include overall system power, volume, brightness, vibration, selection of displayed items, a camera, a microphone, and initiation/termination of device functions. In some embodiments, instead of separate buttons two buttons may be combined into a rocker button. This arrangement is useful in situations where the buttons are configured to control features such as volume or brightness. In other embodiments, button 216 is configured to, in addition to or in lieu of controlling system power, control other aspects of the device 100. In some embodiments, one or more of the buttons 180 are capable of supporting different user commands. By way of example, a normal press has a duration commonly of less than about 1 second and resembles a quick tap. A medium press has a duration commonly of 1 second or more but less than about 12 seconds. A long press has a duration commonly of about 12 seconds or more. The function of the buttons is normally specific to the application that is currently in focus on the respective

display 208. In a communications application for instance and depending on the particular button, a normal, medium, or long press can mean end communication, increase volume of communication, decrease volume of communication, and toggle microphone mute. In a camera or video application for instance and depending on the particular button, a normal, medium, or long press can mean increase zoom, decrease zoom, and take photograph or record video.

**[0084]** As shown in Figs. 2A and 2B, the device 100 may also include a card/memory slot 228 and a port 240 on its side 230. The card/memory slot 228, in embodiments, accommodates different types of cards including a subscriber identity module (SIM) and/or other card based memory. Port 240 in embodiments is an input/output (I/O port) that allows the device 100 to be connected to other peripheral devices, such as a vehicle, phone, keyboard, other display, and/or printing device. As can be appreciated, these are merely some examples and in other embodiments the device 100 may include other slots and ports such as slots and ports for accommodating additional memory devices, facilitating firmware and/or software updates, and/or for connecting other peripheral devices. Also shown in Figs. 2A and 2B is an audio jack 236 that accommodates a tip, ring, sleeve (TRS) connector for example to allow a user to utilize headphones or a headset.

**[0085]** There are also a number of hardware components with the device 100. As illustrated in Fig. 2B, device 100 includes a speaker 268 and a microphone 232. The microphone 232 may be used by the device 100 to receive audio input which may control and/or manipulate applications and/or features of the device 100. In embodiments, device 100 also includes a camera 272 and a light source 276, which may be used to control and/or manipulate applications and/or features of the device 100. It is anticipated that the device 100 may include one or more cameras 272 which can be mounted on any of the surfaces shown in the accompanying figures. In the event that the one or more cameras are used to detect user input, via gestures and/or facial expression, the one or more cameras may be located on the front screen 204. The front screen 204 is shown in Fig. 2A. Additionally, the device 100 includes one or more magnetic sensing feature 252 that, when located in the vehicle-mounted position, provides indication of the engagement position. As can be appreciated, when the device 100 is removed from a vehicle-mounted position the one or more magnetic sensing feature 252 provide the ability to detect the corresponding detachment of the device 100. This sensing may be determined at the device 100, the console, and/or the vehicle itself. An accelerometer and/or gyroscope 256

may also be included as part of the device 100 to determine, among other things, the orientation of the device 100 and/or the orientation of the screen 204.

[0086] Referring to Fig. 2B the console rear 210 is shown in perspective view along with several electrical and mechanical features in accordance with embodiments of the present disclosure. Device 100 includes an electrical and communications connection or docking port 244 that is capable of interfacing with one or more other devices, including a vehicle control system. These other devices may include additional displays, consoles, dashboards, associated vehicle processors, and the like. The docking port 244 is capable of transferring power from other devices to the device 100. Moreover, vehicle and/or functional communications may be made through the docking port 244. Communication may involve sending and receiving one or more signals between a vehicle and the device 100. It is anticipated that when the device 100 is in a vehicle-mounted position the device 100 will be docked via the docking port 244. The connection from the device 100 to at least one other device may be made through the docking port 244 via a physical, inductive, and/or wireless association. It is anticipated that the docking port 244 may incorporate features similar, if not identical, to those described above as engagement feature 212. These features may further allow physical connection to a vehicle mount and/or vehicle. Furthermore, the docking port may provide a physical connection in addition to or apart from the engagement feature 212 previously described.

[0087] As can be appreciated, the description of the device 100 is made for illustrative purposes only, and the embodiments are not limited to the specific mechanical features shown in Figs. 2A-2B and described above. In other embodiments, the device 100 may include additional features, including one or more additional buttons, slots, display areas, and/or locking mechanisms. Additionally, in embodiments, the features described above may be located in different parts of the device 100 and still provide similar functionality. Therefore, Figs. 2A-2B and the description provided above are non-limiting.

[0088] Fig. 3 illustrates components of a device 100 in accordance with embodiments of the present disclosure. In general, the device 100 includes a front screen 204 with a touch sensitive display 208. The front screen 204 may be disabled and/or enabled by a suitable command. Moreover, the front screen 204 can be touch sensitive and can include different operative areas. For example, a first operative area, within the touch sensitive screen 204, may comprise a touch sensitive display 208. In general, the touch sensitive display 208 may comprise a full color, touch sensitive display. A second area within each touch sensitive screen 204 may comprise a gesture capture region 206. The gesture capture

region 206 may comprise one or more area or region that is outside of the touch sensitive display 208 area, 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 206 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 204 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 204 not allocated to a gesture capture region 206 or touch sensitive display 208. 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 204 may be determined from the context in which the device 100 is used and/or operated. In an exemplary embodiment, the touch sensitive screen 204 comprises liquid crystal display devices extending across at least the region of the touch sensitive screen 204 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 204 that are capable of receiving input from the user.

**[0090]** One or more display controllers 316 may be provided for controlling the operation of the touch sensitive screen 204, including input (touch sensing) and output (display) functions. In the exemplary embodiment illustrated in Fig. 3, a touch screen controller 316 is provided for the touch screen 204. In accordance with some embodiments, the functions of a touch screen controller 316 may be incorporated into other components, such as a processor 304.

**[0091]** The processor 304 may comprise a general purpose programmable processor or controller for executing application programming or instructions. In accordance with at least some embodiments, the processor 304 may include multiple processor cores, and/or implement multiple virtual processors. In accordance with still other embodiments, the processor 304 may include multiple physical processors. As a particular example, the processor 304 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 304 generally functions to run programming code or instructions implementing various functions of the device 100.

[0092] A device 100 may also include memory 308 for use in connection with the execution of application programming or instructions by the processor 304, and for the temporary or long term storage of program instructions and/or data. As examples, the memory 308 may comprise RAM, DRAM, SDRAM, or other solid state memory. Alternatively or in addition, data storage 312 may be provided. Like the memory 308, the data storage 312 may comprise a solid state memory device or devices. Alternatively or in addition, the data storage 312 may comprise a hard disk drive or other random access memory.

[0093] In support of communications functions or capabilities, the device 100 can include a cellular telephony module 328. As examples, the cellular telephony module 328 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 100 can include an additional or other wireless communications module 332. As examples, the other wireless communications module 332 can comprise a Wi-Fi, BLUETOOTH™, WiMax, infrared, or other wireless communications link. The cellular telephony module 328 and the other wireless communications module 332 can each be associated with a shared or a dedicated antenna 324.

[0094] A port interface 352 may be included. The port interface 352 may include proprietary or universal ports to support the interconnection of the device 100 to other devices or components, such as a dock, which may or may not include additional or different capabilities from those integral to the device 100. In addition to supporting an exchange of communication signals between the device 100 and another device or component, the docking port 244 and/or port interface 352 can support the supply of power to or from the device 100. The port interface 352 also comprises an intelligent element that comprises a docking module for controlling communications or other interactions between the device 100 and a connected device or component.

[0095] An input/output module 348 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 248 include an Ethernet port, a Universal Serial Bus (USB) port, Institute of Electrical and Electronics Engineers (IEEE) 1394, or other interface.

[0096] An audio input/output interface/device(s) 344 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) 344 may comprise an associated amplifier and analog to digital converter. Alternatively or in addition, the device 100 can include an integrated audio input/output device 356 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 Figs. 2A and 2B. One or more image capture interfaces/devices 340, such as a camera 272, can be included for capturing still and/or video images. Alternatively or in addition, an image capture interface/device 340 can include a scanner or code reader. An image capture interface/device 340 can include or be associated with additional elements, such as a flash or other light source 276.

[0098] The device 100 can also include a global positioning system (GPS) receiver 336. In accordance with embodiments of the present invention, the GPS receiver 336 may further comprise a GPS module that is capable of providing absolute location information to other components of the device 100. An accelerometer(s)/gyroscope(s) 256 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 256 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 256 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 252. The magnetic sensing feature 252 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 208 and/or other device 100 operations. As examples, a magnetic sensing feature 252 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 252 may comprise one or more metallic elements used by other sensors associated with the console and/or vehicle to determine whether the device 100 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 100 can be carried by one or more buses 322. In addition, power can be supplied to the components of the device 100 from a power source and/or power control module 360. The power control module 360 can, for example, include a battery, an AC to DC converter, power control logic, and/or ports for interconnecting the device 100 to an external source of power.

**[0101]** Fig. 4 depicts a block diagram of an embodiment of the device software and/or firmware. The memory 408 may store and the processor 404 may execute one or more software components. These components can include at least one operating system (OS) 416, an application manager 462, a console desktop 466, and/or one or more applications 464a and/or 464b from an application store 460. The OS 416 can include a framework 420, one or more frame buffers 448, one or more drivers 412, and/or a kernel 418. The OS 416 can be any software, consisting of programs and data, which manages computer hardware resources and provides common services for the execution of various applications 464. The OS 416 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 416 is operable to provide functionality to the device 100 by executing one or more operations, as described herein.

**[0102]** The applications 464 can be any higher level software that executes particular console functionality for the user. Applications 464 can include programs such as vehicle control applications, email clients, web browsers, texting applications, games, media players, office suites, etc. The applications 464 can be stored in an application store 460, which may represent any memory or data storage, and the management software associated therewith, for storing the applications 464. Once executed, the applications 464 may be run in a different area of memory 408.

**[0103]** The framework 420 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 420 and the discrete components described hereinafter may be considered part of the OS 416 or an application 464. However, these portions will be described as part of the framework 420, but those components are not so limited. The framework 420 can include, but is not limited to, a Surface Cache module 428, a Window Management module 432, an Input

Management module 436, an Application Model Manager 442, a Display Controller, one or more frame buffers 448, and/or an event buffer 456.

**[0104]** The Surface Cache module 428 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 428 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 428 stores the images of non-active windows (or other display objects) in a data store.

**[0105]** In embodiments, the Window Management module 432 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 432, based on information from the OS 416, or other components, determines when a window (or other display object) is visible or not active. The Window Management module 432 may then put a non-visible window (or other display object) in a “not active state” and, in conjunction with the Task Management module Task Management 440 suspends the application’s operation. Further, the Window Management module 432 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 432 may also provide the stored information to the application 464, or other components interacting with or associated with the window (or other display object). The Window Management module 432 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 436 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 436 receives the events and logically stores the events in an event buffer 456. 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 screen 104 determines that the user has stopped touching the screen 204 etc. These events are received, stored, and forwarded to other modules by the Input Management module 436. The Input Management module 436 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 448 is a logical structure(s) used to render the user interface. The frame buffer 448 can be created and destroyed by the OS kernel 418. However, the Display Controller 444 can write the image data, for the visible windows, into the frame buffer 448. A frame buffer 448 can be associated with one screen or multiple screens. The association of a frame buffer 448 with a screen can be controlled dynamically by interaction with the OS kernel 418. A composite display may be created by associating multiple screens with a single frame buffer 448. Graphical data used to render an application's window user interface may then be written to the single frame buffer 448, for the composite display, which is output to the multiple screens 204. The Display Controller 444 can direct an application's user interface to a portion of the frame buffer 448 that is mapped to a particular display 208, thus, displaying the user interface on only one screen 204. The Display Controller 444 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 448 or a portion thereof. This approach compensates for the physical screen 204 and any other console screens that are in use by the software component above the Display Controller 444.

[0108] The Application Manager 462 is an application that provides a presentation layer for the window environment. Thus, the Application Manager 462 provides the graphical model for rendering. Likewise, the Desktop 566 provides the presentation layer for the Application Store 460. Thus, the desktop provides a graphical model of a surface having selectable application icons for the Applications 464 in the Application Store 460 that can be provided to the Window Management Module 456 for rendering.

[0109] Further, the framework can include an Application Model Manager (AMM) 442. The Application Manager 462 may interface with the AMM 442. In embodiments, the AMM 442 receives state change information from the device 100 regarding the state of applications (which are running or suspended). The AMM 442 can associate bit map images from the Surface Cache Module 428 to the applications that are alive (running or suspended). Further, the AMM 442 may provide a list of executing applications to the Application Manager 462.

[0110] Figs 5A-5E depict multiple representations of a graphical user interface (“GUI”) in accordance with embodiments of the present disclosure. In some embodiments, icons, applications, and/or the presentation layout may be modified via user input and/or automatically via a processor.

[0111] Fig. 5A depicts a first representation of a GUI of a device 100 in accordance with embodiments of the present disclosure. In embodiments, the device 100 is adapted to run and/or display one or more applications that are associated with at least one vehicle function. An application may be displayed onto the touch sensitive screen 204.

Additionally or alternatively, the device 100 may run an application that is designed to control the climate functions of a vehicle. In this case, the climate control application 512a may display a desired temperature, various control features, and one or more virtual buttons to manipulate the control of the application. A user, via the touch sensitive screen 204, may increase or decrease the temperature, set different climate modes (such as air recirculation, vent, fan settings, and the like) and set preferences of the application itself. In embodiments, the device 100 may receive input from a number of different sources, including physical, electrical, and/or audible commands. Input may be received at the device 100 through, but not limited to, the touch sensitive screen 204, microphone 232, hardware buttons 280, ports 228, 240, 236, and combinations thereof.

[0112] Other vehicle applications and their corresponding functions may be run by the device 100, including entertainment applications (music, movies, etc.), trip computer applications (to display mileage traveled, miles per gallon fuel consumption, average speed, etc.), phone controls (especially hands-free phones associated with the vehicle), GPS, road conditions and warnings, and other applications useful to a vehicle operator or passenger. It is anticipated that vehicle applications may be purchased and/or managed via the Application Store 460.

[0113] The Application Store 460 may be similar to an application store for smart phones, mobile devices, and computers. It is anticipated that the present disclosure may use a communications channel or multiple channels available to the vehicle to make an application store purchase and/or download. Moreover, this purchase and download could be effected through the use of at least one individual’s phone associated with the vehicle. In some embodiments, the application store may manage one or more applications remotely. This remote management may be achieved on the “cloud,” possibly as part of a cloud-based storage medium.

[0114] It should be noted that the processing resources required for running, or at least displaying, applications on the device 100 may be split between processors that are associated with the device 100 and processors that are not associated with the device 100.

[0115] In some embodiments, applications 512a, 512b, 512n may include features that allow for custom and/or predefined functionality. This functionality may be associated with the behavior, appearance, and/or operating capability of one or more applications. For example, an application may include a position anchor icon 528 that, when selected, fixes the application to a location on the display 208. Fixing one or more applications in this manner may allow for the custom positioning of other non-fixed applications around the one or more applications that have been anchored. Moreover, applications and/or icons may be moved and positioned in various locations on the front screen 204. For instance, an application may be resized via control handles 540, 536 which may be present on one or more applications. Applications may be relocated and/or positioned in the presentation layout according to various user input 532.

[0116] Additionally or alternatively, applications may be associated with an icon that indicates whether an application is considered essential to vehicle operation. This essential application icon 524, may be selected to designate an application as important to the user and/or vehicle. For example, in the event that an application is configured to display warnings associated with specific states of vehicle operation, the user and/or the device 100 may determine that the application is essential and as such select the essential application icon 524. Selecting the essential application icon 524 may have one or more effects, depending on the specific implementation. It is anticipated that an essential application may be configured to remain displayed on the device 100 or other associated display device if the device 100 is removed from the vehicle-mounted position.

[0117] Various features, buttons, icons, controls, and other aspects of applications may be selected by one or more users, or selected by device 100 in response to predetermined conditions. It is an aspect of the present disclosure that these applications may be selected and controlled by device 100, and/or at least one associated peripheral vehicle device.

[0118] It is another aspect of the present disclosure that the GUI may include a console application tray 504. The console application tray 504 may be configured to provide access to available console applications 508a, 508b, 508c. In addition, the console application tray 504 may display console applications available from an application store and/or provide a link to an application store via one or more icons 520. Whether applications have been installed, displayed, purchased, or are available for purchase via

the application store icon 520, the various status of an application may be indicated in the console application tray 504. For example, if an application is installed and displayed on the device 100, the application icon in the console application tray 504 may appear differently from other icons that are not installed and displayed. In other words, if the icons are displayed in color to illustrate one or more state, they may appear in black and white, or grayscale, to indicate one or more other states. Therefore, given the previous example, available applications may have full color application icons, whereas installed and displayed icons may have grayscale icons. It is anticipated that various states of at least one application icon may be illustrated using various colors, intensities, transparencies, glows, shadows, and the like.

[0119] In some embodiments the console application tray 504 may be accessed by dragging a tray handle 516 or other feature to reveal the console application tray 504. Other embodiments may use gesture recognition features of the touch sensitive display 208, gesture capture region 206, and/or hardware buttons 280 to access the console application tray 504. For instance, the tray 504 may be revealed by a gesture drag on the display 208 using one or more fingers. In addition, the tray 504 may be displayed in response to a predetermined state of the device 100. Revealing the console application tray 504 may be visually represented in a number of ways. Moreover, the effect that revealing the tray may have on displayed applications may also be represented in a number of ways. In some embodiments, the console application tray 504 may fly-out from a side of the device 100. In other embodiments the console application tray 504 may appear from a location of the display 208. The manner in which the console application tray 504 transitions can be configured with regard to speed, color, transparency, audio output, and combinations thereof. In another embodiment, the console application tray 504 may be “pulled” in a direction 530 from a side of the device 100 to appear over displayed applications. In yet another embodiment, the console application tray 504 may be pulled from a side of the device 100 to share the display 208 with any displayed applications 512a, 512b, 512n. This embodiment may require the resizing of displayed applications 512a, 512b, 512n to provide adequate display area for the revealed tray 504. In one embodiment, as the tray 504 increases in size, the displayed applications may decrease in size, and vice versa.

[0120] Fig. 5B depicts a second representation of a GUI of a device 100 in accordance with embodiments of the present disclosure. In embodiments, a user 560 may interface with the GUI and/or the touch-sensitive display 208 to “drag-and-drop” new applications

508a, 508b, 508c, into an application-expanded position on the GUI, where applications 512a, 512b, ..., 512n are shown in a functional state. Additionally, or alternatively, a user 560 may drag applications 512a, 512b, ..., 512n from the application-expanded position of the GUI into the application tray 504. It is anticipated that moving an application from the application-expanded position of the GUI to the application tray 504 may hide and/or remove the chosen application from the application-expanded position of the GUI. It is further anticipated that once returned to the application tray 504, the application may be returned to its previous position via user 560 or automatic input. In some embodiments, the applications may be moved and/or positioned on the GUI according to a directional input 544 provided by the user 560. When a user 560 wishes to initiate a directional input 544 and move of a given application, the user 560 may initiate such a move by a touch, touch and hold, and/or other input gesture. It is an aspect of the present disclosure that moving an application 512a, 512b, ..., 512n from the application tray 504 to an application-expanded position on the GUI does not necessarily initiate a function of the application. Application icons may be moved, repositioned, deleted, hidden, and/or otherwise shown by received input. Once the applications are positioned in a desired configuration, any functionality associated with the positioned applications may be accessed via further input.

**[0121]** Fig. 5C depicts a third representation of a GUI of a device 100 in accordance with embodiments of the present disclosure. As described above, a user 560 may position one or more applications 508a, 508b, 508c from the application tray 504 to an application-expanded position via an input gesture. Although, the applications may be automatically moved to and/or from various positions on the GUI via a processor and rules, a user 560 may arrange the applications on the GUI as desired. For example, Fig. 5C shows a user 560 moving an application 508c from the application tray 504 between two applications 512a, 512b that already occupy an application-expanded position of the GUI. The user 560 may drag and/or drop the application to various positions according to directional input 544. For instance, the user 560 has dragged the application 508c along a line 548 to hold between two applications on the GUI 512a, 512b.

**[0122]** Fig. 5D depicts a fourth representation of a GUI of a device 100 in accordance with embodiments of the present disclosure. Continuing the example described immediately above, the dragged application 508c may be positioned between and/or adjacent to at least one application. Alternatively or additionally, the dragged application 508c may be placed into a position as a first application, where no other applications are

shown in the application-expanded position of the GUI. In some embodiments, a dragged application 508c, when positioned between or adjacent to other applications in the application-expanded position of the GUI may automatically move and/or resize one or more of the other applications along a directional line 556. Although shown in a linear vertical direction, the directional line along which applications are moved may be linear or non-linear, and may be in any direction vertical, horizontal, angled, and/or combinations thereof. For example, Fig. 5D shows application 512b moving below the dragged application 508c to accommodate room for the dragged application 508c when it is dropped, or placed, and expands into an expanded-state. Once a desired position is found for the dragged application 508c, the user 560 may drop the dragged application 508c in place.

[0123] Fig. 5E depicts a fifth representation of a GUI of a device 100 in accordance with embodiments of the present disclosure. As described above, in some embodiments, a dragged application 508c may resize, or expand, into a position on an application-expanded position on the GUI. Fig. 5E shows a dragged application 508c that has been moved into an application-expanded position along with functional features associated with the expanded application 508d. The expanded application 508d may be resized and/or repositioned as described above. Different layouts and/or configurations may be found in a common position in a menu structure.

[0124] Referring now to Fig. 6A, a sixth representation of a GUI of a configurable vehicle console is shown in accordance with an embodiment of the present disclosure. In some instances, the GUI may show a warning, message, and/or application output that utilizes all, or a substantial portion, of the display 208. Although applications may utilize a portion of the display 208 and even be configured for functionality and aesthetics, it is anticipated that certain features are more important than others, especially in the event of an emergency. Therefore, it may be desired to display important information to the display 208 over, or in place of, other applications. For example, in the event of an accident, the vehicle may associate a number of warnings and/or messages to the event. In some cases, these warnings and/or messages may be important for the at least one vehicle operator and/or passenger to review and even respond to. As shown in Fig. 6A, a warning message, indicator, and/or cue image 604 may be presented to the display 208 by the device 100. This information may be presented in response to input detected by the device 100, through GPS, gyroscopic, and/or accelerometer data. Additionally or alternatively,

the information may be presented in response to the device 100 detecting input received from the vehicle and/or at least one peripheral device associated with the vehicle.

**[0125]** The information (warnings, messages, cues, and the like) may be displayed permanently, semi-permanently, or temporarily depending on predetermined settings and/or legal requirements. Permanently displayed information may be shown if an individual has attempted to modify the device 100 or alter specific vehicle systems without authorization. Information of this type may also be displayed permanently if the vehicle and/or the device 100 detects a condition that warrants the permanent display of information, such as a catastrophic engine failure, a dangerous operating condition, and/or other similar conditions. Semi-permanent displayed information may be shown on display 208 until reset via an authorized method. For instance, if the vehicle requires maintenance, a semi-permanent image may be displayed until the maintenance has been received and the semi-permanent image is removed. It is anticipated that the removal of semi-permanent images may be made by authorized personnel. Authorized personnel may make use of special input, and/or devices to remove/reset the image from the display 208.

**[0126]** In some embodiments, one or more images 604 (associated with warnings, messages, cues, and the like) may appear on the display 208, which are then followed by directions, recommendations, and/or controls. Continuing the previous example, if a vehicle is involved in an emergency event (such as an accident), a warning image may be displayed followed by directions and access to specific vehicle controls. The displayed image 604 may be shown above other applications 608 that are displayed on the device 100. Additionally or alternatively, the displayed image 604 may replace other applications and/or displayed information previously shown on the display 208.

**[0127]** Fig. 6B depicts a seventh representation of a GUI of a configurable vehicle console shown in accordance with an embodiment of the present disclosure. Following the emergency example illustrated above, a warning indicator 612, a message 628, and several controls 616, 620, 624 may be shown on the display 208 in the event of an accident or the like. As can be appreciated, in the event of an accident or emergency state, certain applications and displayed information may not be necessary to or even desired by a vehicle operator and/or passenger. In fact, such data may be considered overwhelming to an individual in the event of an emergency. During these stressful times, only key information and controls may be solicited by a vehicle operator and/or passenger. Accordingly, it is one aspect of the present disclosure to provide a warning indicator 612 that may be text, an image, or combinations thereof. This warning indicator 612 alerts at

least one individual that an emergency has been detected by the device 100, the vehicle, and/or associated peripheral device. Audible alerts may also accompany any function, display, and/or warning as described herein. Audible alerts may be played through the device 100, via a speaker 268 or other output. Additionally or alternatively, the audible alerts may be played through an associated peripheral device, and/or a speaker system associated with the vehicle.

**[0128]** Accompanying the warning indicator 612 may be directions, recommendations, or other information in the form of a message 628 that may be interpreted by at least one vehicle operator and/or passenger. This message 628 may include a brief description of the event that caused the alert.

**[0129]** In some embodiments, one or more control icons 616, 620, 624, may be displayed onto the device 100 to provide assistance during the emergency event. For instance, by selecting the “Direct 911” icon 616 from the display 208 a call may be initiated to emergency services at 911 (112, 119, 999, 000, and/or other emergency service contacts). In the event of a less serious accident, phone functions may be controlled with the phone icon 620. It is anticipated that selecting the icon will allow standard phone functions to appear on the display 208, including but not limited to, speed dial, dial keypad, on-hook, off-hook, phone book, and the like. In both of these communication embodiments, the device 100 may make use of an internal communication antenna and communications service. Alternatively, the device 100 may be associated with one or more communication devices, such as a mobile phone, smart-phone, WiFi communication device, SMS, texting device, and the like, where the associated one or more devices may be controlled through the device 100.

**[0130]** In some embodiments, an icon may be included to access vehicle statistics that could prove useful in communicating with emergency personnel. When selected, the vehicle statistics icon 624 may list conditions of the vehicle, orientation, location, forces recorded, and other information that may be used in post-accident analysis. For example, an individual may have been involved in a roll-over collision that renders the vehicle inoperable, and upside-down. While communicating to emergency services via the communication method described above, the individual may be prompted to access (select) the vehicle statistics icon 624 to determine if the vehicle fuel system has been compromised and/or if any fire is detected. If so, the individual may be encouraged to move away from the vehicle and/or take a different course of action than if no vehicle statistics were checked. Any number of statistics may be displayed by selecting this icon

624, but it should be appreciated that the statistics may be ordered in levels of critical importance. Although described with respect to an emergency scenario, it should be appreciated that these warnings, messages, associated content, and behavior may be introduced by the device 100 as a response to predetermined input.

[0131] Referring to Fig. 7, a flow diagram depicting a configurable vehicle console method 700 is shown in accordance with embodiments of the present disclosure. A device 100 may be displaying one or more applications on the GUI in a first presentation layout (step 704). The method continues by detecting input received at the device 100, in particular at the GUI (step 708). This input is interpreted by the device 100 to determine a corresponding processor action (step 712). For instance, the received input may represent an instruction to change the first presentation layout displayed on the device 100 at which point the method continues at step 716. Alternatively, the received input may be some other type of recognized and/or unrecognized input and the processor may determine alternate action based on this input. In the event that the input is determined as an instruction to change the presentation layout, the processor selects a second presentation layout to display on the GUI, and sends a command to display the second presentation layout at step 716.

[0132] The method 700 may continue by detecting further input at the GUI (step 720). This further input may represent a plurality of commands, including but not limited to a change presentation layout command or an application control command. In the event that the input represents a change presentation layout command, the method may continue at 712. However, in the event that the input represents an application control command, the method continues at step 728. The processor may determine which vehicle function is to be controlled based on the input and control the function as the input directs (step 728). Once the vehicle function is controlled, the method 700 may continue at step 720 to detect additional input and may even repeat the process 700.

[0133] Fig. 8 is a flow diagram depicting a configurable vehicle console method 800 in accordance with embodiments of the present disclosure. In general, the method 800 is directed to an automatically configurable console in response to specific inputs detected. The method begins at step 804, where the device detects input received. This input may be received via a communication interface with the vehicle and/or with associated devices. For instance, input may include but is not limited to that received from one or more phones associated with a vehicle. Additionally or alternatively, the input may be received from sensors and/or equipment associated with the vehicle. For example, the input may be

in the form of a sensor signal sent via CAN Bus and associated controllers to the device 100. The method 800 continues at step 808, where the processor determines whether the input received qualifies as an emergency event. It may be desired to store in memory specific signals and/or signal conditions that the device 100 may refer to in determining one or more emergency event matches. In the event that the input received indicates an emergency event has occurred, an emergency identifier may be displayed on the GUI (step 812). This identifier may be displayed on any available GUI that is in communication with, or part of, the device 100.

**[0134]** The method 800 may display one or more interactive elements when an emergency is detected (step 816). These interactive elements may, as described above, include phone controls, vehicle statistics, and emergency communication contact icons. It is anticipated that these icons, although represented on a touch sensitive display 208, may be activated and/or selected through various inputs other than touch. The device 100 may detect input at the GUI, which may be equipped with various features as described above, including a camera, microphone, and touch sensitive display (step 820). For example, the device 100 may be configured to receive audible, visual, touch, and/or a combination thereof as the various input. Additionally or alternatively, one or more specific icons may be selected automatically by the processor. This automatic selection may be in response to certain signals that represent a priority of emergency.

**[0135]** The method continues where the input is determined to represent an interactive element control or another input altogether (step 824). In the event that the input detected represents an instruction to control an interactive element, the processor determines which interactive element is to be controlled based on the input and controls the interactive element (step 828). In some embodiments, this interactive element may include a device that is associated with the vehicle and/or the device 100.

**[0136]** Referring to Fig. 9, a flow diagram depicting a removable, configurable vehicle console method 900 is shown in accordance with embodiments of the present disclosure. The method 900 begins by detecting a first state of the device 100 (step 904). The first state of the device 100 may be detected by input received from one or more of sensors, sensing elements, and/or electrical signals. In some embodiments, the state of the device 100 may be detected when the device 100 is in a removably attached and/or detached state. Further, the device 100 may detect one or more states of the device 100, which may be in between a removably attached state and a detached state.

[0137] When detected, the device 100 may be displaying a first presentation layout on the GUI (step 908). This first presentation layout may display a plurality of applications simultaneously on the GUI. The display of these applications may have been previously configured by automatically and/or by a user. The first state of the device 100 and the first presentation layout are stored in memory (step 912). Storing these conditions in memory may include associating the first state of the device 100 with the first presentation layout. This association may be made to facilitate switching from one state to another. For example, when a device 100 state is altered, a presentation layout may be displayed on the device 100 that refers to the association stored in memory. Alternatively, the conditions may be stored separately without association.

[0138] The method continues when a second state of the device is detected (step 916). As described above, the second state of the device 100 may be detected by input received from one or more of sensors, sensing elements, and/or electrical signals. Similarly, the second state of the device 100 may be detected when the device 100 is in a removably attached and/or detached state.

[0139] The presentation layout of the device 100 may be changed or maintained in response to a state change and/or user input (step 920). In some embodiments, stored rules may be referred to by the processor in determining whether a presentation layout change will be effected. Stored rules may determine a presentation layout change. In the event that the presentation layout will be changed, the device may be directed to display a second presentation layout (step 924). The method 900 may continue by detecting further input that may change the presentation layout to the first presentation layout and/or a third presentation layout.

[0140] Fig. 10 is a flow diagram depicting a removable, configurable vehicle console method 1000 in accordance with embodiments of the present disclosure. Specifically, Fig. 10 depicts a flow diagram for determining presentation layout changes (step 1020). The method 1000 begins by referring to stored rules (step 1004). Referring to stored rules may be part of, or associated with, the previously described determinative step 920 in Fig. 9. The method 1000 continues at step 1008, where a determination is made by the processor as to whether a user query is required. In the event that a query is required, the processor may query a user with an option to change the presentation layout (step 1012). The method 1000 continues by detecting input at the device 100 (step 1016). The option to change the presentation layout may be displayed to the GUI in the form of a selectable option. Additionally or alternatively, the option may output as an audible alarm, tone,

and/or phrase. The user may select an option by interfacing with the GUI and/or the device. It is anticipated that the user selection input from one or more users may be received via a microphone and/or camera. User selection input may include gestures, facial expressions, oral/verbal commands, and/or combinations thereof. If no query is set forth in the stored rules, the method may continue by following rules regarding the presentation layout display (step 1014).

**[0141]** A processor may determine whether the input received at the device 100 is directed to maintaining the current presentation layout display or altering the current presentation layout display (step 1020). If the user desires a change to the presentation layout, the method 1000 may continue at step 1024. Step 1024 describes where a modified presentation layout is displayed in response to a user input. In the event that the presentation layout is determined to be maintained, the method may continue at step 1028, where the first presentation layout is displayed on the device 100.

**[0142]** The present disclosure includes embodiments that describe a vehicle having an application store displayed by an on-board console or display providing occupants with plural applications for free or paid download. The application store may be maintained by a cloud-based vendor and/or be pre-stored in vehicle memory at the point of sale. Access to the application store can be gated or triggered based on vehicle state, configuration, and/or operation. Additionally or alternatively, the configuration of the application store can be dependent upon the vehicle state, configuration, and/or operation. Application store configuration, for instance, can refer to the particular applications provided to the user through the application store and the ordering or ranking of the applications in the application store and/or one or more features or functions of the application store. Application store access and/or configuration can further be based on observed user behavior and/or behaviors of other users (*e.g.*, operators of other vehicles).

**[0143]** Fig. 11 depicts another example of an application store display window opened by a user. The window 1100 includes the application store icon 1104 (which has been selected by the user) and a main icon 1108 (to return to an earlier window in the menu). The drop down window resulting from selection of the application store icon 1104 includes recommended applications 1112 (which are depicted as GPS applications 1132, vehicle maintenance applications 1140, sensing applications (which provide to a user real time or near real time sensed information) 1136, and music (*e.g.*, media player) applications 1144), popular applications 1116, applications by category 1120, installed applications 1124, and search 1128.

**[0144]** The recommended applications icon 1112, when selected, provides recommendations based on user preferences, a user profile (including for example likes and dislikes, socioeconomic information, hobbies, and the like), user input, user or operator behavior (e.g., driving patterns, application selection/purchase/downloading history, and the like), sensed information regarding vehicle state, configuration, operation, occupant(s), location, observed user behavior (e.g., observed application preferences of the current and/or other users of vehicles in previous transactions), type, make, model, and/or year of manufacture of the vehicle, currently docked communication devices of the user and the device's content and capabilities, vehicle manufacturer requirements or restrictions (e.g., maintaining manufacturer control over applications can be important to maintaining vehicle safety levels), and/or other factors, and behavior and/or application preferences of non-occupants or third party users (particularly drivers of other vehicles located proximately or within a selected geographic region). The applications selected as recommended applications can vary in response to changes in any of the above information. Typically, each application is assigned a preference value based on or more of the above types of information, which value is updated periodically. The preference values of the applications are compared, with the higher (or lower depending on configuration) valued applications being treated as "recommended" or "not recommended". Only the recommended applications are displayed when the icon 1112 is selected.

**[0145]** By way of example, application recommendations may be based on sensed information when the vehicle is in operation. For instance, a vehicle maintenance or repair application may be pushed to or pulled by the display device 100 when sensed information and/or the vehicle control system indicates a potential mechanical or other operational issue or trigger for routine maintenance to occur. In another instance, a map or location-based service may be pushed to or pulled by the display device 100 in response to a current sensed location of the vehicle.

**[0146]** The popular applications icon 1116, when selected, provides those applications that are most popular (with respect to purchase, free download, or both) over a selected time period among a selected set of users. The selected set of users may depend on a current location of a user and be based on a geopolitical relationship of the current user location. For instance, the selected set of users may, relative to a current location of the user, be global, country wide, statewide, county wide, city wide, and the like. For example, an application to access a local news, weather or radio station may be limited to

users within a certain distance of the station's signal broadcast antenna. Alternatively or additionally, the selected set of users may be users of the same type, make, model, and/or year of manufacture of the vehicle 100. For example, an application, such as a vehicle maintenance application, may be limited, in usefulness, to users of Toyota Camrys.

[0147] The applications by category icon 1120, when selected, provides applications by category. Categories include, for example, automotive maintenance or repair, automotive monitoring, location-based services (*e.g.*, navigation), entertainment (*e.g.*, media), games, health and fitness, lifestyle, travel, medical, news, weather, productivity, reference, maps, social networking, utilities, and the like.

[0148] The application memberships of each of the recommended and popular applications 1112 and 1116 can vary user-by-user. In other words, a first vehicle operator can have a first (application) membership for one of recommended and popular applications 1112 and 1116 and a second different vehicle operator can have a second different (application) membership of the one of recommended and popular applications 1112 and 1116. This stems from the differing results obtainable based on the factors applied in determining (application) membership.

[0149] The installed applications icon 1124, when selected, provides a listing of applications currently installed on the display device 100 for editing. Editing includes deletion or removal and deactivation (when currently executing).

[0150] The search icon 1128, when selected, provides a search capability to search an application store library for applications satisfying user specified search terms and/or phrases.

[0151] The Vehicle Control System

[0152] Fig. 12 illustrates a vehicle 1200 according to an embodiment. The vehicle 1200 includes, among many other components common to vehicles, wheels 1207, a power source 1209 (such as an engine, motor, or energy storage system (*e.g.*, battery or capacitive energy storage system)), a manual or automatic transmission 1212, a manual or automatic transmission gear controller 1216, a power controller 1220 (such as a throttle), a vehicle control system 1224, the display device 100, a braking system 1236, a steering wheel 1240, a power source activation/deactivation switch 1244 (*e.g.*, an ignition), an occupant seating system 1248, a wireless signal receiver 1253 to receive wireless signals from signal sources such as roadside beacons and other electronic roadside devices, and a satellite positioning system receiver 1257 (*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).

**[0153]** The vehicle 1200 includes a number of sensors in wireless or wired communication with the vehicle control system 1224 and/or display device 100 to collect sensed information regarding the vehicle state, configuration, and/or operation. Exemplary sensors include wheel state sensor 1260 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 1264 to sense a power output of the power source 1209 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 1268 to determine a current activation or deactivation state of the power source activation/deactivation switch 1244, a transmission setting sensor 1270 to determine a current setting of the transmission (*e.g.*, gear selection or setting), a gear controller sensor 1272 to determine a current setting of the gear controller 1216, a power controller sensor 1274 to determine a current setting of the power controller 1220, a brake sensor 1276 to determine a current state (braking or non-braking) of the braking system 1236, a seating system sensor 1278 to determine a seat setting and current weight of seated occupant, if any) in a selected seat of the seating system 1248, exterior and interior sound receivers 1290 and 1292 (*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.

**[0154]** In the depicted vehicle embodiment, the various sensors are in communication with the display device 100 and vehicle control system 1224 via signal carrier network 1280. As noted, the signal carrier network 1280 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.

**[0155]** In one implementation, the control system 1224 receives and reads sensor signals, such as wheel and engine speed signals, as a digital input comprising a pulse width modulated (PWM) signal. The processor 304 can be configured, for example, to read each of the PWM 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 PWM 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.

**[0156]** The Application Store

**[0157]** The application store 460 includes plural applications 464a, 464b, . . . The applications 464 can be any higher level software that executes particular console functionality for the user. Applications 464 can include programs such as vehicle control applications (*e.g.*, sensed information display icons (such as in the form of dials, gauges, and the like (*e.g.*, odometer, speedometer, oil pressure, tacometer, battery voltage, tire pressure, gas tank level, engine temperature, indoor/outdoor temperature, trip computers, vehicle/component status reporting, maintenance tire pressure, vehicle/component performance monitoring, and other vehicle-related (sensed) information), applications associated with at least one vehicle function, applications related to handicap and accessibility graphical user interfaces (*e.g.*, larger fonts, controls, text-to-speech and/or speech-to-text interfaces, speech command interfaces, *etc.*), email clients, web browsers, communications applications (*e.g.*, email applications, texting applications, telephony applications, *etc.*), games (solo or multi-party games, including games played against other drivers), entertainment applications such as media players (*e.g.*, to enable access to, viewing of, or listening to multimedia files, particularly audio and/or video files), satellite positioning system receiver applications (*e.g.*, for location tracking, fleet tracking, geocoding, geofencing, geotagging, traffic patterns, navigating to a selected destination or other location, and other location-based services), map applications, medical information applications, emergency service applications, noise suppression applications, news-related applications (to provide local, national, and/or international news from a news source), weather information-related applications (to provide local, national, and/or international weather information, such as forecasts, radar images, social networking applications, road conditions, and current weather conditions), biometric applications (*e.g.*, to determine an identity of or authenticate a user, to determine a current medical condition of a user, to determine a current sobriety state of a user, and the like), travel applications (*e.g.*, applications providing the operator with booking or reservation information, traffic information, fuel pricing information, point-of-interest information, and the like), utility applications (*e.g.*, office suites, electronic calendars, electronic clocks, and the like), *etc.*

[0158] The applications 464 can be stored in an application store 460, which may represent any memory or data storage, and the management software associated therewith, for storing the applications 464. Once executed, the applications 464 may be run in a different area of memory 408.

[0159] It is anticipated that vehicle applications may be purchased, freely accessed, and/or managed via the Application Store 460. The application store 460 may be similar to an application store for smart phones, mobile devices, and computers. It is anticipated that the present disclosure may use a communications channel or multiple channels available to the vehicle to make an application store purchase and/or download. Moreover, this purchase and download could be effected through the use of at least one individual's phone associated with the vehicle. In some embodiments, the application store may manage one or more applications remotely. This remote management may be achieved on the "cloud," possibly as part of a cloud-based storage medium.

[0160] Fig. 13 depicts a display window that appears when an application icon in the application store is selected. The window 1300 includes a name of the application 1304, a high level description of the application 1306, an information icon 1308 for more detailed information about the application, a down cursor 1312 to scroll down through the application description, and a price icon 1316 to provide a charge required to download the application corresponding to the selected application icon.

[0161] The operation of the application manager 462 and application store 460 will now be discussed with reference to Figs. 14A and 14B.

[0162] In step 1400, the application manager 462 collects data regarding a current vehicle state, configuration, operation, occupant(s), and other sensed information (received from one or more of the sensors referenced herein), user preferences, user profile, user input, user behavior, location, type, make, model, and/or year of manufacture of the vehicle and/or other factors, and behavior and/or application preferences of non-occupants or third party users (particularly drivers of other vehicles located proximately or within a selected geographic region of a current satellite-based location of the vehicle 1200).

[0163] In decision diamond 1404, the application manager 462 determines whether to permit or enable access to the application store. This determination may be in response to user preferences, vehicle manufacturer policies or rules, federal, state, or local law, and the like. Such restrictions can hinder drivers and other vehicle operators from operating vehicles while interacting with the application store, thereby substantially reducing driver distraction and reducing accidents, particularly among teenage drivers.

[0164] Vehicle-device-use laws may be provided by an organization, governmental entity, group, individual, and/or combinations thereof. The laws may be stored locally or retrieved from a remotely located storage. The vehicle-in-use laws may be statutes and/or regulations that are enforced by a government entity, such as a city, municipality, county, province, state, country, and the like. These laws may define vehicle, traffic, transportation, and/or safety rules associated with a given geographical region. An exemplary vehicle-in-use law governs texting, cellular phone use, video availability to the operator when the car is in motion and the like). The laws may be updated from time to time to, among other things, account for changes in the laws. While the user/vehicle is traveling in a first geopolitical entity, the application manager may refer to the laws of the first geopolitical entity and determine to control the display device 100 in accordance with the first geopolitical entity's law. When the user/vehicle is detected as being in a second geopolitical entity, the application manager controls the display device 100 based, at least in part, on the laws of the second geopolitical entity. The on-board vehicle sensors may determine at least one location of the user/vehicle, and refer to laws associated with that at least one location to control the display device 100 accordingly.

[0165] The application manager may also recognize one or more characteristics associated with a user, the user's vehicle, and/or device and limit access to device features at least partially based on the one or more characteristics.

[0166] In one configuration, these characteristics may include, but are not limited to, location of the user and/or device, user profile settings, user preferences, registration status of the device, device settings, programmed conditions, and the like. For example, a user may be operating a device in the passenger seat of an automobile. Moreover, the user may have established a connection between the device and the vehicle (e.g., via Bluetooth, direct electrical connection, wireless, radio frequency (RF), infrared (IR), etc.). In this example, the vehicle control system may utilize one or more of the vehicle/device sensors to determine the location of the device user. Upon detecting that the user and/or device in this case is located in a passenger seat, the application manager may determine that feature access should not be controlled. On the other hand, if the user was seated in a vehicle operation seat (e.g., driver's seat) the application manager may determine to limit access to one or more features of the display device, particularly the application store.

[00100] It is anticipated that the application manager may refer to other factors when determining to allow or deny a user access to a device's features. Among these other factors are contractual rules/obligations, programmed conditions, vehicle state, emergency

contingencies, and combinations thereof. For instance, a vehicle may be detected to be “in motion” by the feature control module and various vehicle/device sensors. Based on the vehicle state (i.e., in motion), the location of the user (i.e., driver’s seat), and a local law (i.e., prohibiting use of devices by drivers of a moving vehicle) the application manager may determine to deny access to application store features.

[0167] In some embodiments, the application manager may itself receive from the satellite positioning system receiver in the vehicle satellite location information alone or in conjunction with vehicle-related state, configuration, and/or operation information (speed, parking sensors, etc.) to determine the current vehicle state, configuration, and/or operation. When, for example, a vehicle is in motion, the application manager can disallow/deactivate application store access. Once the vehicle is determined to be in a “parked” condition (e.g., in “Park”), or otherwise motionless, the application store may be allowed and activated.

[00101] In some embodiments, the application manager may deactivate only selected features of the application store.

[00102] In any of the above embodiments, the deactivation may be coupled with a presented warning in the form of a visual and/or audible alert on the display device.

[00103] The application manager may reactivate these deactivated features once the vehicle is in a state of rest and/or parked.

[00104] Deactivation of the application store may also be in response to contract requirements (such as employment or insurance contracts), employer rules or policies, *etc.*

[0168] Access to the application store may also be restricted based on unsuccessful authentication of the user.

[0169] Referring again to Fig. 14A, when access is to be denied, the application manager returns to step 1400, and, when complete or partial access is to be permitted, the application manager proceeds to step 1408.

[0170] In step 1408, the application manager determines whether a communication device, other than an on-board communication device, is docked or otherwise connected with the display device 100. It further determines what applications are installed on the communication device that may be executed by the display device 100. In response, the user may be queried whether the application is to be executed by the display device 100 rather than or in addition to execution by the communication device. Appropriate changes may be made to license restrictions or permissions to enable the application to be installed and executed or run, temporarily or permanently, on the display device 100. As will be

appreciated, the changes required to comply with license restrictions depend on the type of software license. A perpetual license allows a customer to install and use software indefinitely. A subscription license allows the user to use the software for a specified time period. A freeware license is offered as freeware by the author and does not require paying any fee for use. A shareware license is a license to use software for a trial period followed by payment of a shareware fee if further use is desired. A volume license allows a user to install the software on a certain number of computers. A site/enterprise license provides access to software at a single location. A server (network) license is licensed per server. A per seat (machine) license is licensed per machine/seat. A per processor license is licensed per processor in the server on which the software is executing.

**[0171]** In step 1412, the application manager determines what applications to include in the application store for presentation to the user. In this step, memberships of sets of applications corresponding to recommended applications 1112, popular applications 1116, applications by category 1120, and installed applications 1124 are determined as set forth above. As noted, memberships can be a function of the information collected in steps 1400 and 1408.

**[0172]** In one configuration, the applications presentable and/or selectable to the user of the vehicle are restricted by the vehicle manufacturer. This can be done by enforcing vehicle manufacturer white lists and/or black lists of applications. Alternatively or additionally, this can be done by requiring compliance with predetermined requirements or restrictions. Maintaining manufacturer control over applications can be important to maintaining vehicle brand goodwill and safety levels.

**[0173]** In step 1416, the application manager determines an ordering of application icons in the application store. Generally, the ordering is based on a determined desirability of each application to the user. For example, the application manager determines for each of the application store application sets or classes, namely recommended applications 1112, popular applications 1116, applications by category 1120, and installed applications 1124, an ordering or ranking of the applications presented to the user. In one configuration, the applications in each of recommended, popular, and/or applications by category applications 1112, 1116, and 1120 are determined based on a selected set of metrics or factors and/or ranking algorithms, which may be the same or different when compared to one another. The set of metrics or parameters and/or ranking algorithms for the recommended applications 1112 can thus differ from the set of metrics or parameters applied for each of popular and applications by category applications 1116 and 1120 and

so on. The relative rankings of the applications in the recommended, popular, and/or applications by category applications 1112, 1116, and 1120 are commonly based on a relative score or rating value determined by the ranking algorithm. By way of illustration, a first application relates to maintenance or repair of the vehicle and a second application to location-based services. When a user is on a long trip, such as application manager determined by miles driven as a function of time, and sensed information is within normal value ranges, the location-based services is assigned a higher ranking than the maintenance or repair application. When the user is not on a long trip or when sensed information is outside normal value ranges and a possible vehicle component malfunction is detected, the maintenance or repair application is assigned a higher ranking than the maintenance or repair application.

[0174] In step 1120, the application manager determines whether or not to enable an audio interface to enable user interaction with the application store. This interface can be initiated as a result of a user preference, a state, configuration, or operation of the vehicle, and the like. In one configuration, the audio interface provides, by audio output and for a selected menu selection, each application option to the user and the user, through spoken command, accesses the various options and operations of the application store. For safety reasons, the application manager can disable the video (application store) output or window(s) and enable the audio output, such as when the vehicle is in motion.

[0175] Referring now to Fig. 14B, the application manager, in step 1424, presents the application store selections/options to the user as discussed above.

[0176] In step 1428, the application manager receives a request from the user for an application selection.

[0177] In optional step 1432, the application manager authenticates the user and, if necessary, obtains payment information for the selected application.

[0178] In step 1436, the application manager, when the application is not stored locally, requests the application to be uploaded onto a wide area network, such as the Internet, and transmitted to the application manager for downloading into local memory.

[0179] In step 1440, the application manager downloads the selected application from the wide area network and installs the application in memory.

[0180] In step 1442, the application manager returns to step 1400.

[0181] The exemplary systems and methods of this disclosure have been described in relation to configurable vehicle consoles and associated devices. However, to avoid unnecessarily obscuring the present disclosure, the preceding description omits a number

of known structures and devices. This omission is not to be construed as a limitation of the scopes of the claims. Specific details are set forth to provide an understanding of the present disclosure. It should however be appreciated that the present disclosure may be practiced in a variety of ways beyond the specific detail set forth herein.

**[0182]** 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 Personal Computer (PC), laptop, netbook, smart phone, Personal Digital Assistant (PDA), tablet, etc., 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.

**[0183]** 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.

**[0184]** 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.

**[0185]** A number of variations and modifications of the disclosure can be used. It would be possible to provide for some features of the disclosure without providing others.

**[0186]** In some embodiments, 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.

**[0187]** 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.

**[0188]** 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.

[0189] 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.

[0190] 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, embodiments, 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.

[0191] 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.

[0192] 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.

What is claimed is:

1. A method of configuring a vehicle control system graphical user interface (“GUI”) to display a plurality of vehicle applications, comprising:

displaying, at a first time, a plurality of applications in a first presentation layout on at least a first GUI, wherein the plurality of applications are configured to communicate with at least one vehicle function associated with each application;

receiving a first input at the at least a first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the at least a first GUI and the second presentation layout corresponds to a second position and behavior of each application different from the first presentation layout;

selecting, by a processor, the second presentation layout to display on the at least a first GUI;

sending, by a processor, a command to display the second presentation layout on the at least a first GUI; and

displaying, at a second time, the second presentation layout on the at least a first GUI.

2. The method of claim 1, further comprising:

receiving a second input at the at least a first GUI, wherein the second input manipulates at least one control associated with at least one application of the plurality of applications;

determining, by a processor, a vehicle function to control based on the second input; and

controlling the determined vehicle function based on the second input.

3. The method of claim 1, wherein the first input comprises a movement from a first position on the at least a first GUI to a second position on the at least a first GUI.

4. The method of claim 1, wherein altering the first presentation layout to the second presentation layout includes adding at least one application to be displayed on the at least a first GUI.

5. The method of claim 1, wherein altering the first presentation layout to the second presentation layout includes removing at least one application from being displayed on the at least a first GUI.

6. The method of claim 1, wherein the vehicle functions include one or more of the climate system, audio system, mechanical features, electrical features, trip computer, associated phone, map and guidance system.

7. The method of claim 1, further comprising:  
receiving, one or more signals sent from a plurality of sensing elements associated with a vehicle;

interpreting, by a processor, the one or more signals to determine whether an emergency event has occurred;

determining that an emergency event has occurred; and

displaying, automatically, an emergency identifier on the at least a first GUI.

8. The method of claim 7, wherein the interpretation step further comprises:  
referring to a memory, wherein the memory stores rules that define a plurality of signal conditions corresponding to an emergency event.

9. The method of claim 7, wherein the emergency identifier is displayed as a third presentation layout on the at least a first GUI.

10. The method of claim 7, wherein the emergency identifier is displayed over at least one of the first and second presentation layout on the at least a first GUI.

11. The method of claim 10, wherein an appearance of at least one of the first and second presentation layout is altered to emphasize the display of the emergency identifier.

12. The method of claim 7, further comprising:  
displaying automatically one or more interactive emergency elements on the at least a first GUI, wherein at least one of the one or more interactive emergency elements is configured to control a device associated with the vehicle.

13. The method of claim 12, wherein the controlled at least one device is communication hardware.

14. The method of claim 12, wherein the emergency identifier is displayed on a second GUI.

15. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform the method comprising:

displaying, at a first time, a plurality of applications in a first presentation layout on at least a first GUI, wherein the plurality of applications are configured to communicate with at least one vehicle function associated with each application;

receiving a first input at the at least a first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the at least a first GUI and the second presentation layout corresponds to a second position and behavior of each application different from the first presentation layout;

selecting, by a processor, the second presentation layout to display on the at least a first GUI;

sending, by a processor, a command to display the second presentation layout on the at least a first GUI; and

displaying, at a second time, the second presentation layout on the at least a first GUI.

16. The non-transitory computer readable medium of claim 15, wherein the method further comprises:

receiving a second input at the at least a first GUI, wherein the second input manipulates at least one control associated with at least one application of the plurality of applications;

determining, by a processor, a vehicle function to control based on the second input; and

controlling the determined vehicle function based on the second input.

17. The non-transitory computer readable medium of claim 15, wherein the method further comprises:

receiving, one or more signals sent from a plurality of sensing elements associated with a vehicle;

interpreting, by a processor, the one or more signals to determine whether an emergency event has occurred;

determining that an emergency event has occurred; and

displaying, automatically, an emergency identifier on the at least a first GUI.

18. The non-transitory computer readable medium of claim 15, wherein the method further comprises:

displaying automatically one or more interactive emergency elements on the at least a first GUI, wherein at least one of the one or more interactive emergency elements is configured to control a device associated with the vehicle.

19. A device for configuring a vehicle control system graphical user interface (“GUI”) to display a plurality of vehicle applications, comprising:

a first GUI including a first display area;

a first input gesture area of the first display;

a vehicle signal input/output port, wherein the vehicle signal input/output port is configured to receive and send signals to and from a plurality of vehicle controls;

a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform the method comprising:

displaying, at a first time, a plurality of applications in a first presentation layout on the first GUI, wherein the plurality of applications are configured to communicate with vehicle functions that are associated with each application;

receiving a first input at the first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the first GUI and the second presentation layout corresponds to a second position and behavior of each application different from the first presentation layout;

selecting, by a processor, the second presentation layout to display on the first GUI;

sending, by a processor, a command to display the second presentation layout on the first GUI; and

displaying, at a second time, the second presentation layout on the first GUI.

20. The device of claim 19, further comprising a second GUI including a second display area.

21. A method of configuring a vehicle control system graphical user interface (“GUI”) of a console device, comprising:

detecting, by a processor, a first state of the console device, wherein the first state of the console device is one of attached to or removed from a vehicle-mounted position on a vehicle;

storing, in memory, the first state of the console device and a first presentation layout associated with the first state;

detecting, by a processor, a second state of the console device, wherein the second state of the console device is different from the first state of the console device, and

wherein the second state of the console device is the other of attached to or removed from the vehicle-mounted position; and

referring, by a processor, to stored rules to determine whether to change the first presentation layout of the console device based on the detected second state of the console device.

22. The method of claim 21, wherein the stored rules comprise directions to maintain the first presentation layout of the console device when the second state of the console device is detected.

23. The method of claim 22, further comprising:  
querying a user with an option to change the first presentation layout to a second presentation layout;

receiving input from the user, wherein the input corresponds to a decision to change or maintain the first presentation layout; and

sending, by a processor, a command that represents the decision to change or maintain the first presentation layout.

24. The method of claim 22, further comprising:  
displaying, at a first time, a plurality of applications in the first presentation layout on a first GUI, wherein the plurality of applications are configured to communicate with vehicle functions that are associated with each application;

receiving a first input at the first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the first GUI and the second presentation layout is different from the first presentation layout;

selecting, by a processor, the second presentation layout to display on the first GUI;

sending, by a processor, a command to display the second presentation layout on the first GUI; and

displaying, at a second time, the second presentation layout on the first GUI.

25. The method of claim 24, further comprising:  
receiving a second input at the first GUI, wherein the second input manipulates at least one control associated with at least one application of the plurality of applications;

determining, by a processor, a vehicle function to control based on the second input; and

controlling the determined vehicle function based on the second input.

26. The method of claim 21, wherein the stored rules comprise directions to change the first presentation layout of the console device to a second presentation layout when the second state of the console device is detected.

27. The method of claim 26, wherein the second presentation layout is configured to operate as a stand-alone computing device.

28. A non-transitory computer readable medium having instructions stored thereon that, when executed by a processor, perform the method comprising:

detecting, by a processor, a first state of the console device, wherein the first state of the console device is one of attached to or removed from a vehicle-mounted position on a vehicle;

storing, in memory, the first state of the console device and a first presentation layout associated with the first state;

detecting, by a processor, a second state of the console device, wherein the second state of the console device is different from the first state of the console device; and

referring, by a processor, to stored rules to determine whether to change the first presentation layout of the console device based on the detected second state of the console device.

29. The non-transitory computer readable medium of claim 28, wherein the stored rules comprise directions to maintain the first presentation layout of the console device when the second state of the console device is detected.

30. The non-transitory computer readable medium of claim 29, the method further comprising:

querying a user with an option to change the first presentation layout to a second presentation layout;

receiving input from the user, wherein the input corresponds to a decision to change or maintain the first presentation layout; and

sending, by a processor, a command that represents the decision to change or maintain the first presentation layout.

31. The non-transitory computer readable medium of claim 29, the method further comprising:

displaying, at a first time, a plurality of applications in the first presentation layout on a first GUI, wherein the plurality of applications are configured to communicate with vehicle functions that are associated with each application;

receiving a first input at the first GUI, wherein the first input corresponds to an instruction to alter the first presentation layout to a second presentation layout, wherein the first presentation layout corresponds to a first position and behavior of each application of the displayed plurality of applications on the first GUI and the second presentation layout is different from the first presentation layout;

selecting, by a processor, the second presentation layout to display on the first GUI;

sending, by a processor, a command to display the second presentation layout on the first GUI; and

displaying, at a second time, the second presentation layout on the first GUI.

32. The non-transitory computer readable medium of claim 31, the method further comprising:

receiving a second input at the first GUI, wherein the second input manipulates at least one control associated with at least one application of the plurality of applications;

determining, by a processor, a vehicle function to control based on the second input; and

controlling the determined vehicle function based on the second input.

33. The non-transitory computer readable medium of claim 32, the method further comprising:

wherein the stored rules comprise directions to change the first presentation layout of the console device to a second presentation layout when the second state of the console device is detected.

34. The non-transitory computer readable medium of claim 32, the method further comprising:

wherein the second presentation layout is configured to operate as a stand-alone computing device.

35. A removable, configurable console device for displaying and interacting with a plurality of user-controllable vehicle applications, comprising:

a first graphical user interface (“GUI”) including a touch sensitive display;

an input/output port, wherein the input/output port is configured to send and receive signals between the console device and a plurality of devices associated with a vehicle;

at least one engagement feature, wherein the at least one engagement feature is configured to selectively connect the console device to a vehicle-mounted position on the vehicle; and

a switch element configured to detect a state of the console device, wherein the state of the console device is one of attached to or removed from the vehicle-mounted position.

36. The device of claim 35, further comprising:

a processor; and

a non-transitory computer readable medium having instructions stored thereon that, when executed by a processor perform the method comprising:

detecting, by a processor, a first state of the console device, wherein the first state of the console device is one of attached to or removed from a vehicle-mounted position on a vehicle;

storing, in memory, the first state of the console device and a first presentation layout associated with the first state;

detecting, by a processor, a second state of the console device, wherein the second state of the console device is different from the first state of the console device; and

referring, by a processor, to stored rules to determine whether to change the first presentation layout of the console device based on the detected second state of the console device.

37. The device of claim 36, further comprising:

a power supply.

38. The device of claim 35, further comprising:

a tether, wherein the tether connects the device to at least one of a vehicle mount and vehicle.

39. The device of claim 18, wherein the tether is configured to supply at least one of power, communications, and physical connection to the device.

40. The device of claim 35, wherein one of the plurality of devices associated with the vehicle is a phone.

41. A method, comprising:

providing, by a microprocessor executable application manager, a vehicle operator with an application store, the application store comprising information relating to a plurality of applications available for installation on a vehicle computer;

receiving, from the vehicle operator, a request to install at least one of the plurality of applications; and

installing, by the application manager, the selected at least one of the plurality of applications in an electronic readable memory of the vehicle.

42. The method of claim 41, further comprising:

configuring the application store based on one or more of vehicle state, configuration, and/or operation.

43. The method of claim 42, wherein said configuring comprises at least one of:

(i) determining a relative ranking of each of the plurality of applications;

(ii) determining which applications are to be included in the plurality of applications; and

(iii) enabling and/or disabling one or more features and/or functions of the application store.

44. The method of claim 42, wherein the plurality of applications comprise applications directed to one or more of the following: a vehicle control application, application associated with at least one vehicle task, function, and operation, application related to handicap and accessibility graphical user interfaces, email client, web browser, communications application, game, entertainment application, satellite positioning system receiver application, automotive navigation application or device, map application, medical information application, emergency service application, noise suppression application, news-related application, vehicle manual related application, weather information-related application, biometric application, travel application, speech recognition application such as to provide hands-free voice control of other applications, application to read to the operator Really Simple Syndication (“RSS”) feeds, Twitter messages, email messages, and/or instant messages, social networking application, streaming media application, and utility application, wherein the application store configuration is based on sensed information received from one or more vehicle sensors, and wherein the sensed information comprises one or more of the following: wheel state, vehicle speed, acceleration, deceleration, wheel rotation, wheel speed, wheel slip, power source energy output, engine speed, energy input and/or output, turbine speed, input speed, crankshaft position, manifold absolute pressure, mass flow, switch state, a transmission setting, a gear control current setting, a setting of a power controller, a state of a braking system, a seat setting, a weight and/or identity of seated occupant, exterior sound levels,

interior sound levels, safety system state, light setting, brake control setting, accelerator pedal setting or angle, clutch pedal setting, emergency brake pedal setting, door setting, engine temperature, passenger compartment or cabin temperature sensor, window setting, imaging output, odometer reading, trip mileage reading, wind speed, radar transmitter/receiver output, brake wear, steering/torque, oxygen level, ambient lighting, ranging sensor output, parking sensor output, heating, venting, and air conditioning (HVAC) sensor output, water sensor output, air-fuel ratio meter output, blind spot monitor output, hall effect sensor output, radio frequency (RF) sensor output, infrared (IR) sensor output, vehicle control system sensor output, wireless network sensor output, vehicle location, vehicle direction of travel, and cellular data sensor output.

45. The method of claim 42, wherein the application store configuration is based on observed behavior of the vehicle operator and/or behaviors of operators of other vehicles.

46. The method of claim 42, wherein the application store configuration is based on one or more of a type, make, model and/or year of manufacture of the vehicle.

47. The method of claim 43, wherein the configuring comprises step (i).

48. The method of claim 43, wherein the configuring comprises step (ii).

49. The method of claim 43, wherein the configuring comprises step (iii).

50. The method of claim 42, wherein an application store configuration is based on one or more of whether a communication device, separate from the vehicle, is docked or otherwise in signal communication with the application manager and a configuration of and/or applications stored on and executable by the communication device.

51. The method of claim 50, wherein the application manager changes license restrictions or permissions to enable one or more of the applications stored on the communication device to execute on a processor on-board the vehicle.

52. A tangible, non-transient computer readable medium, comprising microprocessor executable instructions that, when executed, perform the following steps:

providing a vehicle operator with an application store, the application store comprising information relating to a plurality of applications available for installation on a vehicle computer; and

receiving, from the vehicle operator, a request to install at least one of the plurality of applications in an electronic readable memory of the vehicle.

53. The computer readable medium of claim 52, wherein the instructions, when executed, perform the further step:

configuring the application store based on one or more of vehicle state, configuration, and/or operation.

54. The computer readable medium of claim 53, wherein said configuring comprises at least one of:

- (i) determining a relative ranking of each of the plurality of applications;
- (ii) determining which applications are to be included in the plurality of applications; and
- (iii) enabling and/or disabling one or more features and/or functions of the application store.

55. The computer readable medium of claim 53, wherein the plurality of applications comprise applications directed to one or more of the following: a vehicle control application, application associated with at least one vehicle task, function, and operation, application related to handicap and accessibility graphical user interfaces, email client, web browser, communications application, game, entertainment application, satellite positioning system receiver application, automotive navigation application or device, map application, medical information application, emergency service application, noise suppression application, news-related application, vehicle manual related application, weather information-related application, biometric application, travel application, speech recognition application such as to provide hands-free voice control of other applications, application to read to the operator Really Simple Syndication (“RSS”) feeds, Twitter messages, email messages, and/or instant messages, social networking application, streaming media application, and utility application, wherein the application store configuration is based on sensed information received from one or more vehicle sensors, and wherein the sensed information comprises one or more of the following: wheel state, vehicle speed, acceleration, deceleration, wheel rotation, wheel speed, wheel slip, power source energy output, engine speed, energy input and/or output, turbine speed, input speed, crankshaft position, manifold absolute pressure, mass flow, switch state, a transmission setting, a gear control current setting, a setting of a power controller, a state of a braking system, a seat setting, a weight and/or identity of seated occupant, exterior sound levels, interior sound levels, safety system state, light setting, brake control setting, accelerator pedal setting or angle, clutch pedal setting, emergency brake pedal setting, door setting, engine temperature, passenger compartment or cabin temperature sensor,

window setting, imaging output, odometer reading, trip mileage reading, wind speed, radar transmitter/receiver output, brake wear, steering/torque, oxygen level, ambient lighting, ranging sensor output, parking sensor output, heating, venting, and air conditioning (HVAC) sensor output, water sensor output, air-fuel ratio meter output, blind spot monitor output, hall effect sensor output, radio frequency (RF) sensor output, infrared (IR) sensor output, vehicle control system sensor output, wireless network sensor output, vehicle location, vehicle direction of travel, and cellular data sensor output.

56. The computer readable medium of claim 53, wherein the application store configuration is based on observed behavior of the vehicle operator and/or behaviors of operators of other vehicles.

57. The computer readable medium of claim 53, wherein the application store configuration is based on one or more of a type, make, model and/or year of manufacture of the vehicle.

58. The computer readable medium of claim 54, wherein the configuring comprises step (i).

59. The computer readable medium of claim 54, wherein the configuring comprises step (ii).

60. The computer readable medium of claim 54, wherein the configuring comprises step (iii).

61. The computer readable medium of claim 53, wherein an application store configuration is based on one or more of whether a communication device, separate from the vehicle, is docked or otherwise in signal communication with the microprocessor and a configuration of and/or applications stored on and executable by the communication device.

62. The computer readable medium of claim 61, wherein the microprocessor changes license restrictions or permissions to enable one or more of the applications stored on the communication device to execute on a processor on-board the vehicle.

63. A device, comprising:  
a microprocessor executable application manager operable to:  
provide a vehicle operator with an application store, the application store comprising information relating to a plurality of applications available for installation on a vehicle computer;  
receive, from the vehicle operator, a request to install at least one of the plurality of applications; and

install, by the application manager, the selected at least one of the plurality of applications in an electronic readable memory of the vehicle.

64. The device of claim 63, wherein the application manager is further operable to:

configure the application store based on one or more of vehicle state, configuration, and/or operation.

65. The device of claim 64, wherein said configuring comprises at least one of:

- (i) determining a relative ranking of each of the plurality of applications;
- (ii) determining which applications are to be included in the plurality of applications; and
- (iii) enabling and/or disabling one or more features and/or functions of the application store.

66. The device of claim 64, wherein the plurality of applications comprise applications directed to one or more of the following: a vehicle control application, application associated with at least one vehicle task, function, and operation, application related to handicap and accessibility graphical user interfaces, email client, web browser, communications application, game, entertainment application, satellite positioning system receiver application, automotive navigation application or device, map application, medical information application, emergency service application, noise suppression application, news-related application, vehicle manual related application, weather information-related application, biometric application, travel application, speech recognition application such as to provide hands-free voice control of other applications, application to read to the operator Really Simple Syndication (“RSS”) feeds, Twitter messages, email messages, and/or instant messages, social networking application, streaming media application, and utility application, wherein the application store configuration is based on sensed information received from one or more vehicle sensors, and wherein the sensed information comprises one or more of the following: wheel state, vehicle speed, acceleration, deceleration, wheel rotation, wheel speed, wheel slip, power source energy output, engine speed, energy input and/or output, turbine speed, input speed, crankshaft position, manifold absolute pressure, mass flow, switch state, a transmission setting, a gear control current setting, a setting of a power controller, a state of a braking system, a seat setting, a weight and/or identity of seated occupant, exterior sound levels, interior sound levels, safety system state, light setting, brake control setting, accelerator pedal setting or angle, clutch pedal setting, emergency brake pedal setting, door setting,

engine temperature, passenger compartment or cabin temperature sensor, window setting, imaging output, odometer reading, trip mileage reading, wind speed, radar transmitter/receiver output, brake wear, steering/torque, oxygen level, ambient lighting, ranging sensor output, parking sensor output, heating, venting, and air conditioning (HVAC) sensor output, water sensor output, air-fuel ratio meter output, blind spot monitor output, hall effect sensor output, radio frequency (RF) sensor output, infrared (IR) sensor output, vehicle control system sensor output, wireless network sensor output, vehicle location, vehicle direction of travel, and cellular data sensor output.

67. The device of claim 64, wherein the application store configuration is based on observed behavior of the vehicle operator and/or behaviors of operators of other vehicles.

68. The device of claim 64, wherein the application store configuration is based on one or more of a type, make, model and/or year of manufacture of the vehicle.

69. The device of claim 65, wherein the configuring comprises operation (i).

70. The device of claim 65, wherein the configuring comprises operation (ii).

71. The device of claim 65, wherein the configuring comprises operation (iii).

72. The device of claim 64, wherein an application store configuration is based on one or more of whether a communication device, separate from the vehicle, is docked or otherwise in signal communication with the application manager and a configuration of and/or applications stored on and executable by the communication device.

73. The device of claim 72, wherein the application manager changes license restrictions or permissions to enable one or more of the applications stored on the communication device to execute on a processor on-board the vehicle.

74. The device of claim 74, further comprising:

a passenger compartment for the vehicle operator;

a transmission;

a power source to provide power to the transmission;

a plurality of sensors to collect the sensed information; and

a vehicle control system to control vehicle operations.

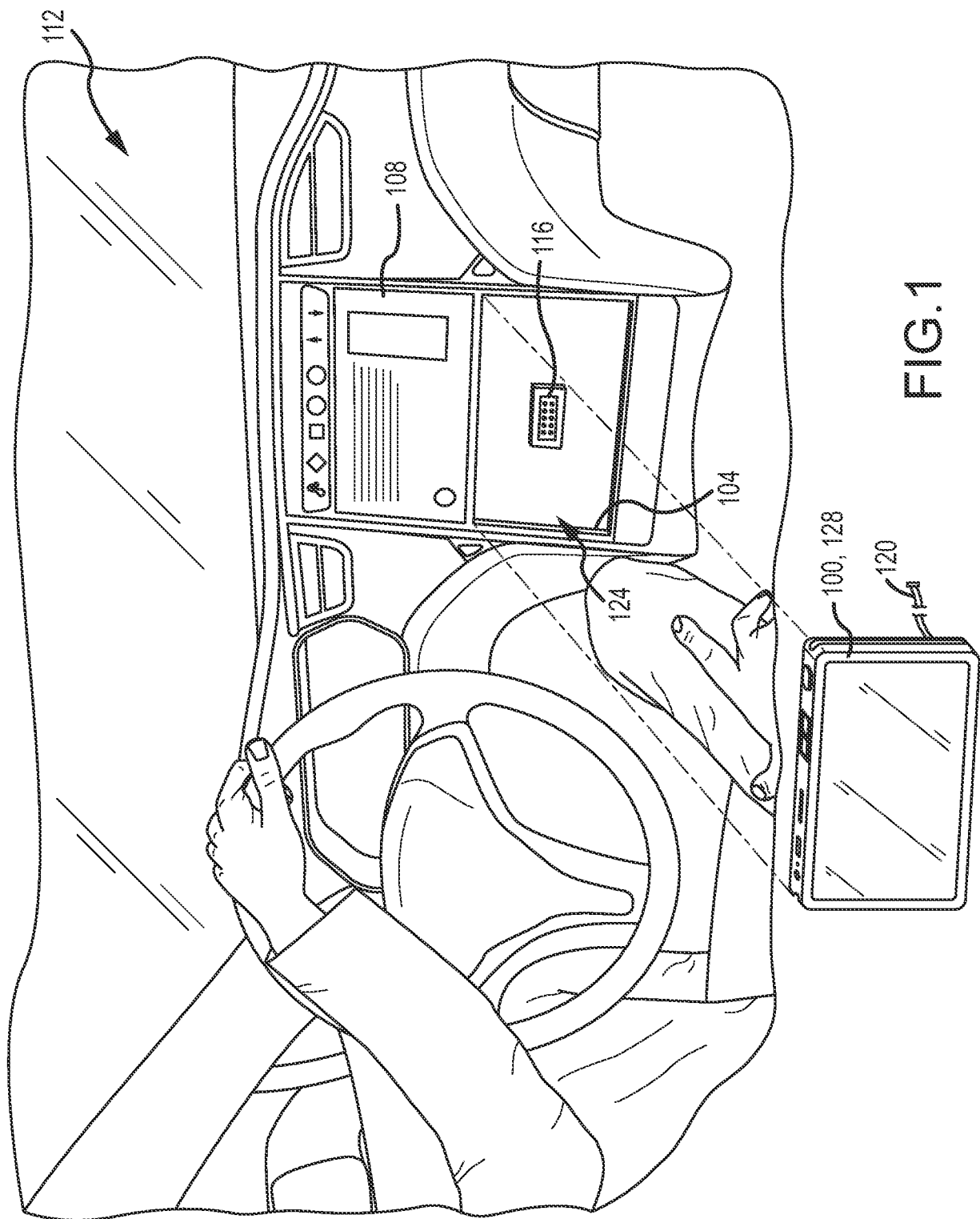


FIG. 1

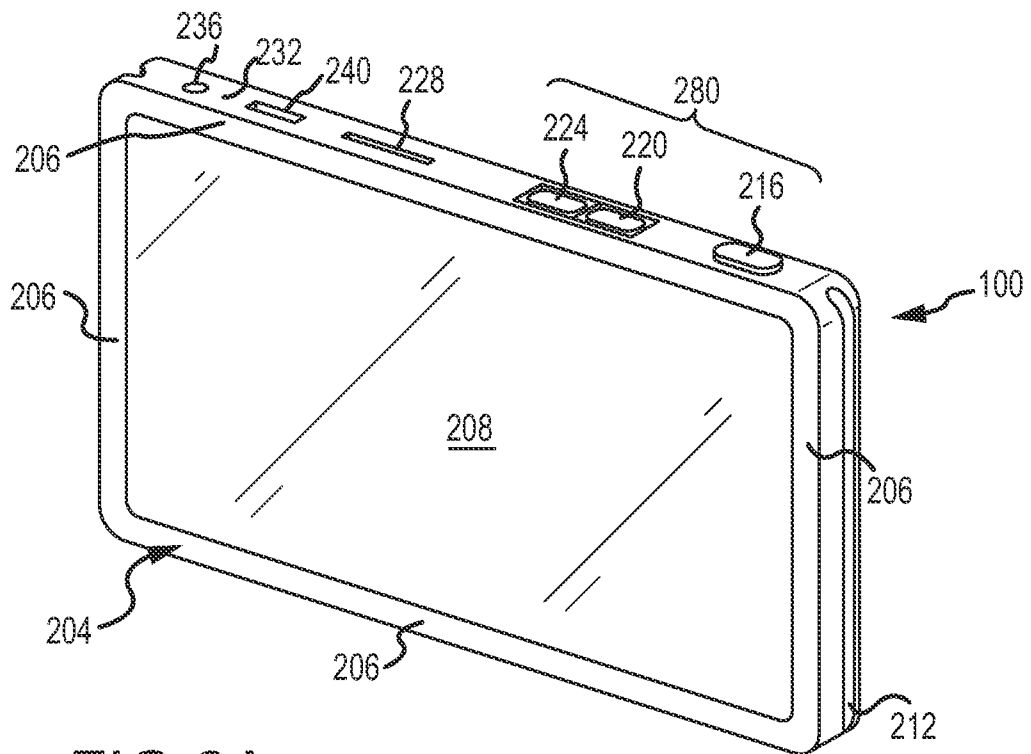


FIG. 2A

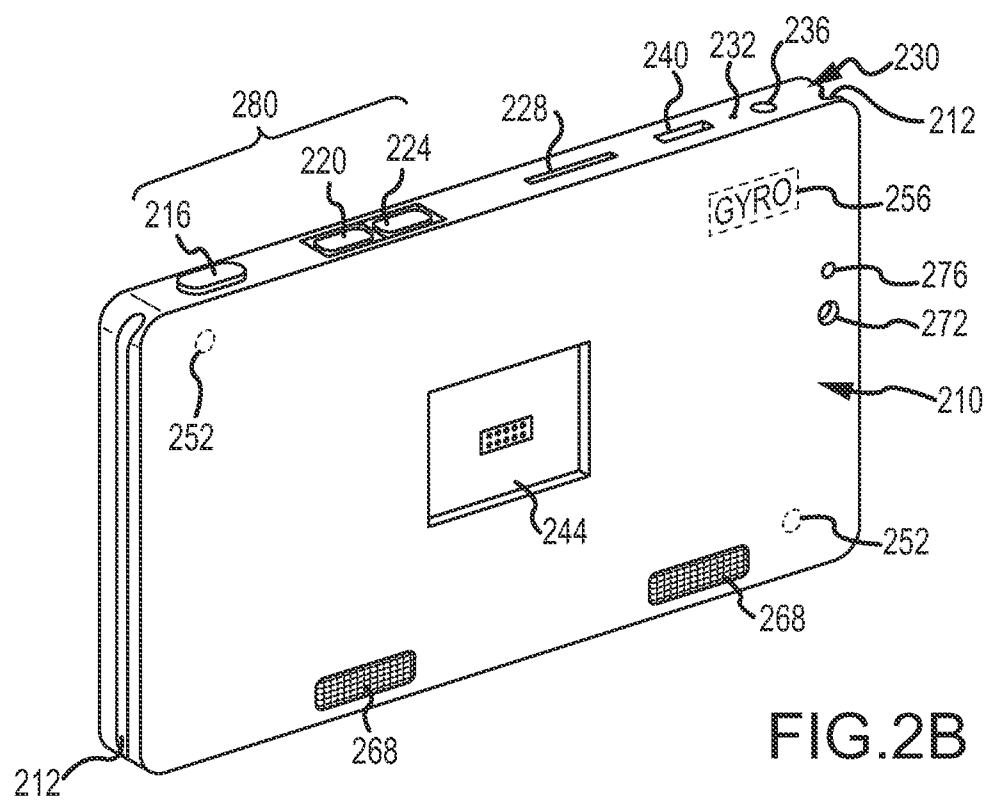


FIG. 2B

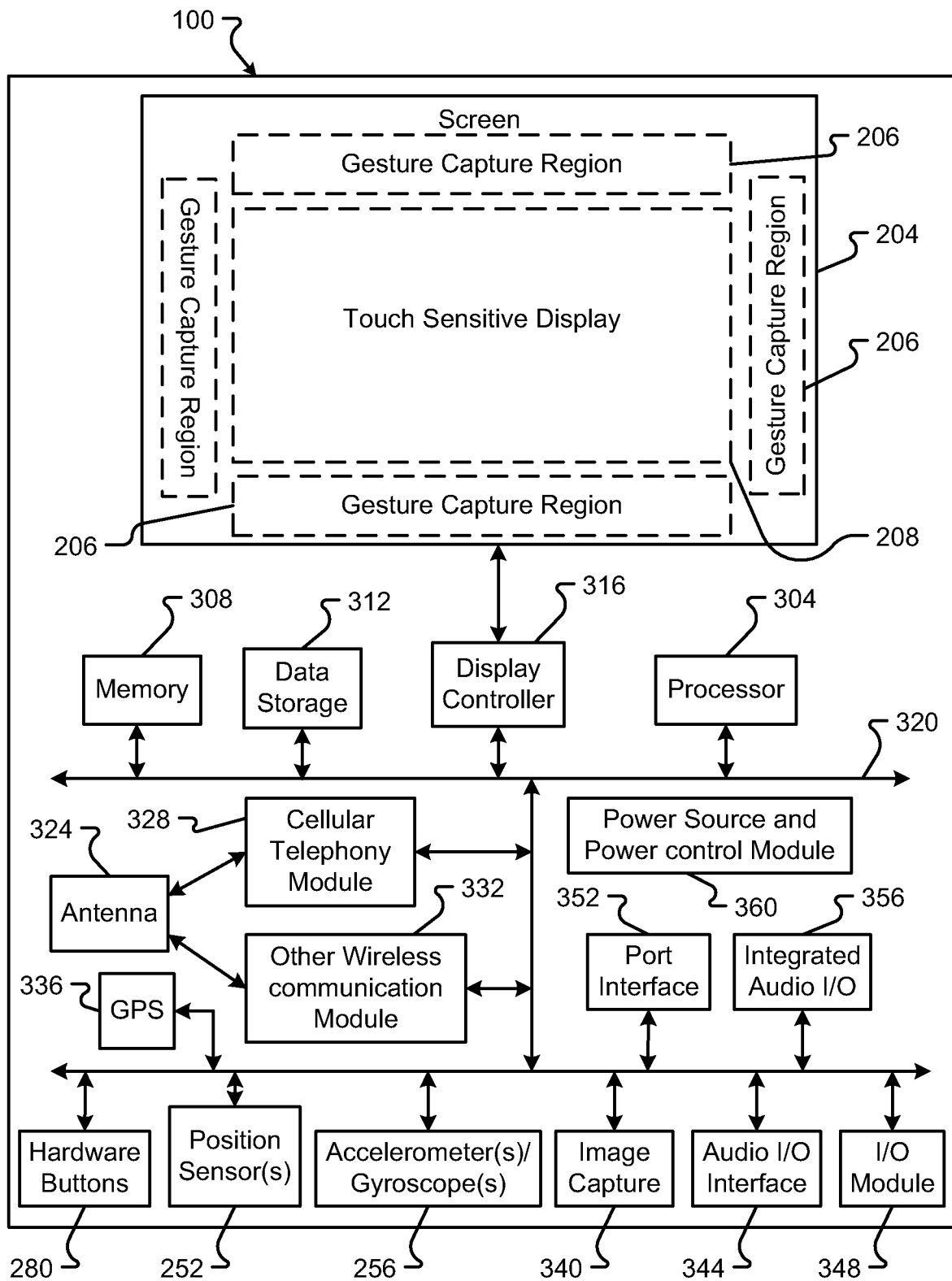


FIG. 3

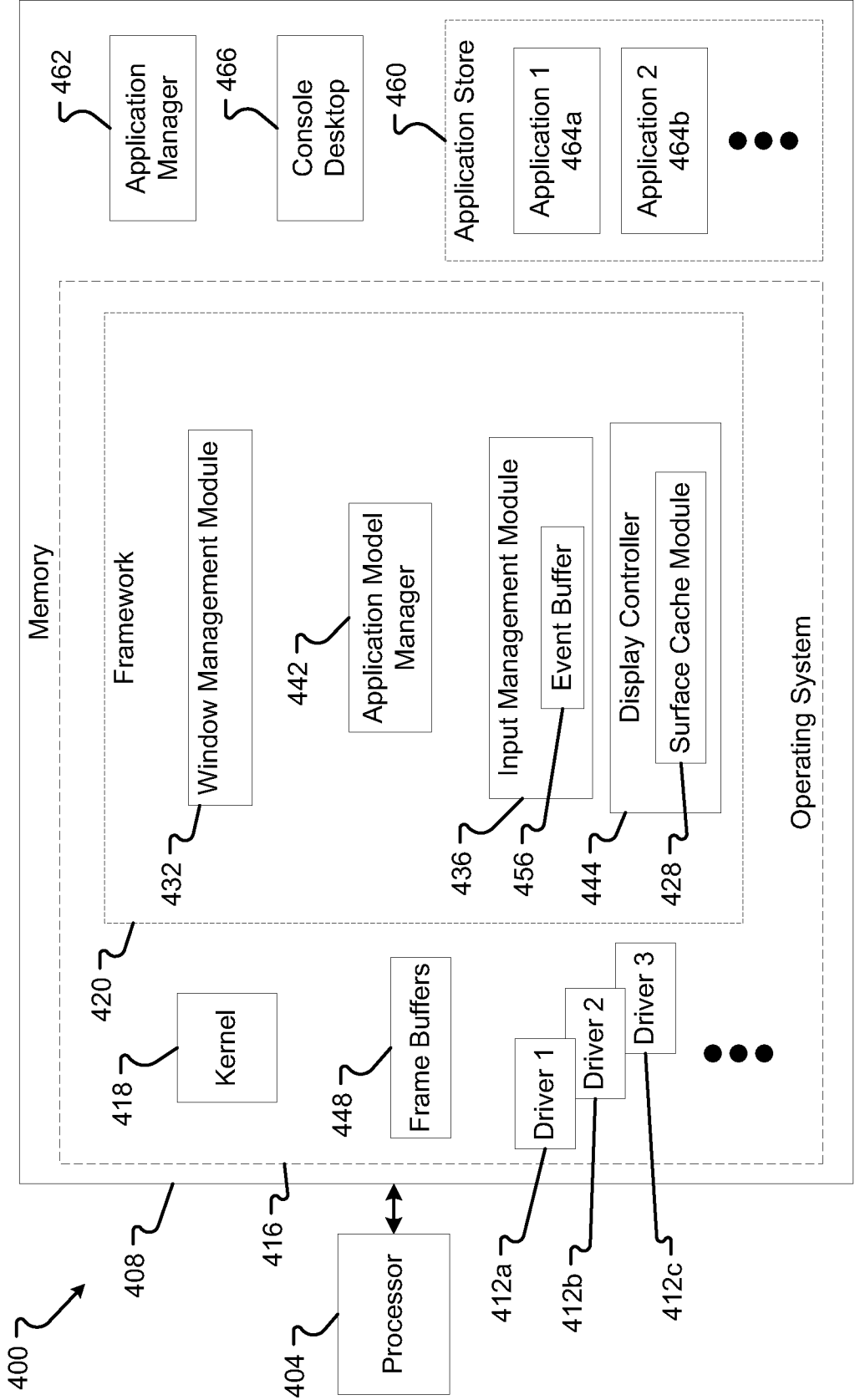


FIG. 4

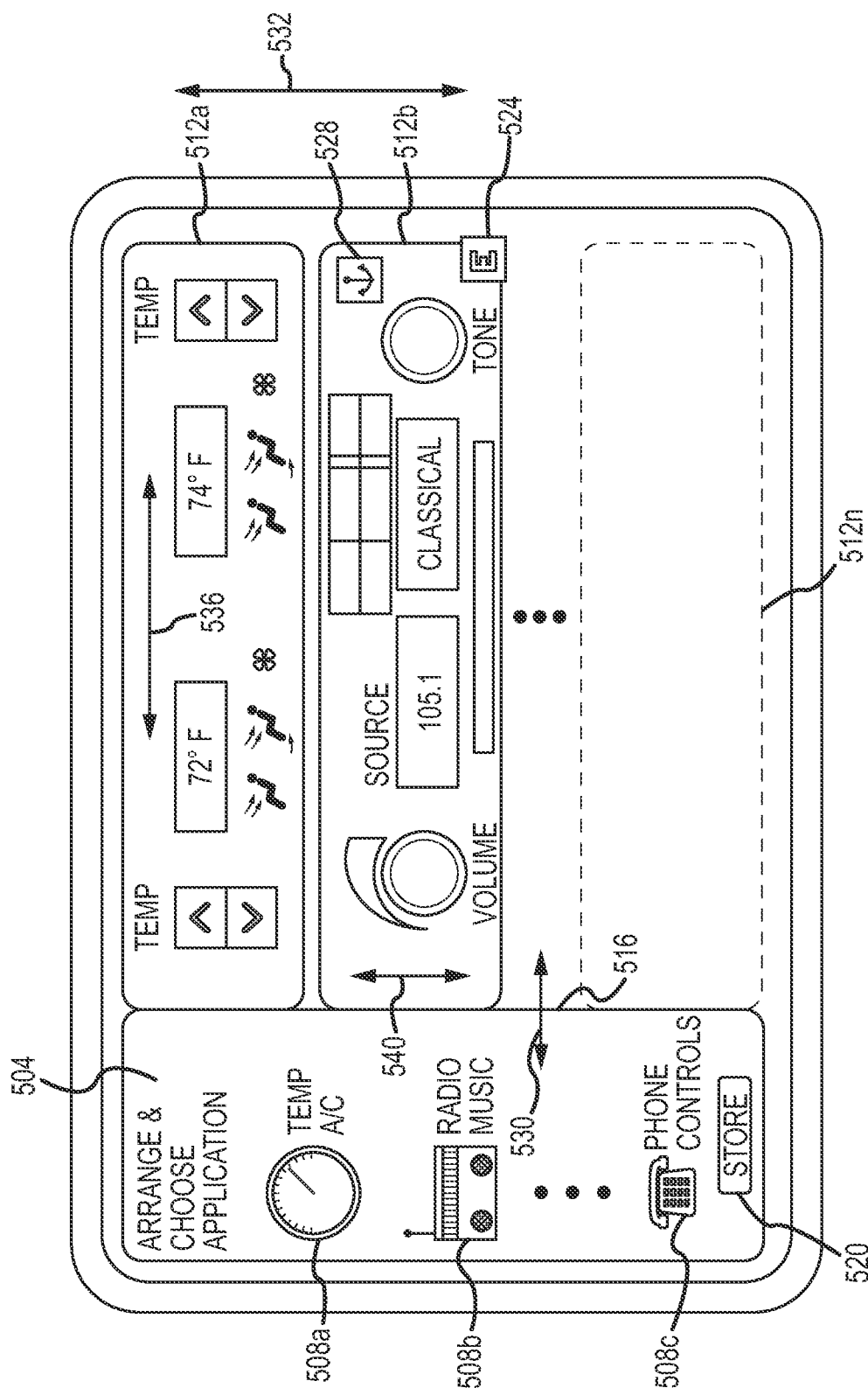


FIG. 5A

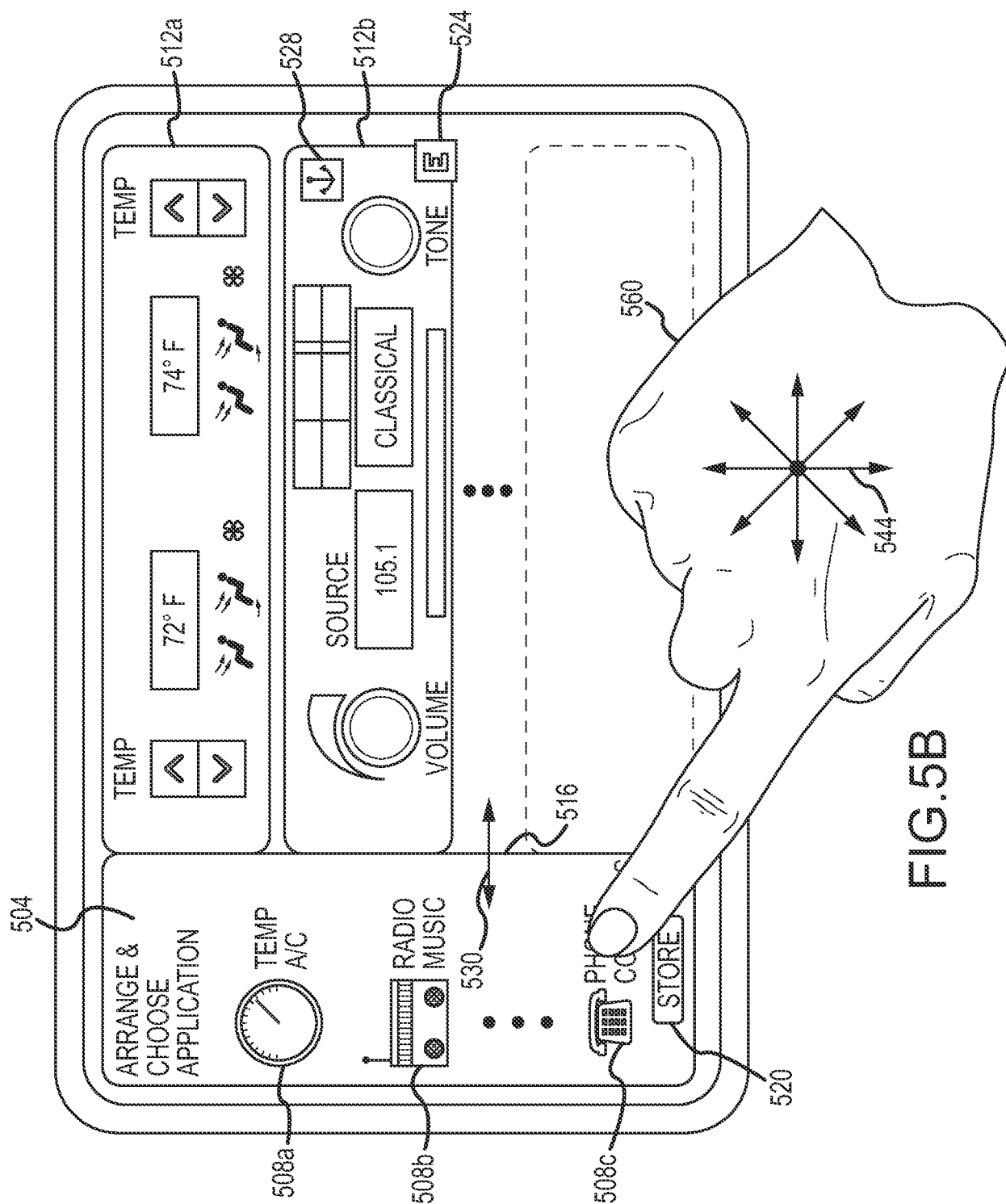


FIG. 5B

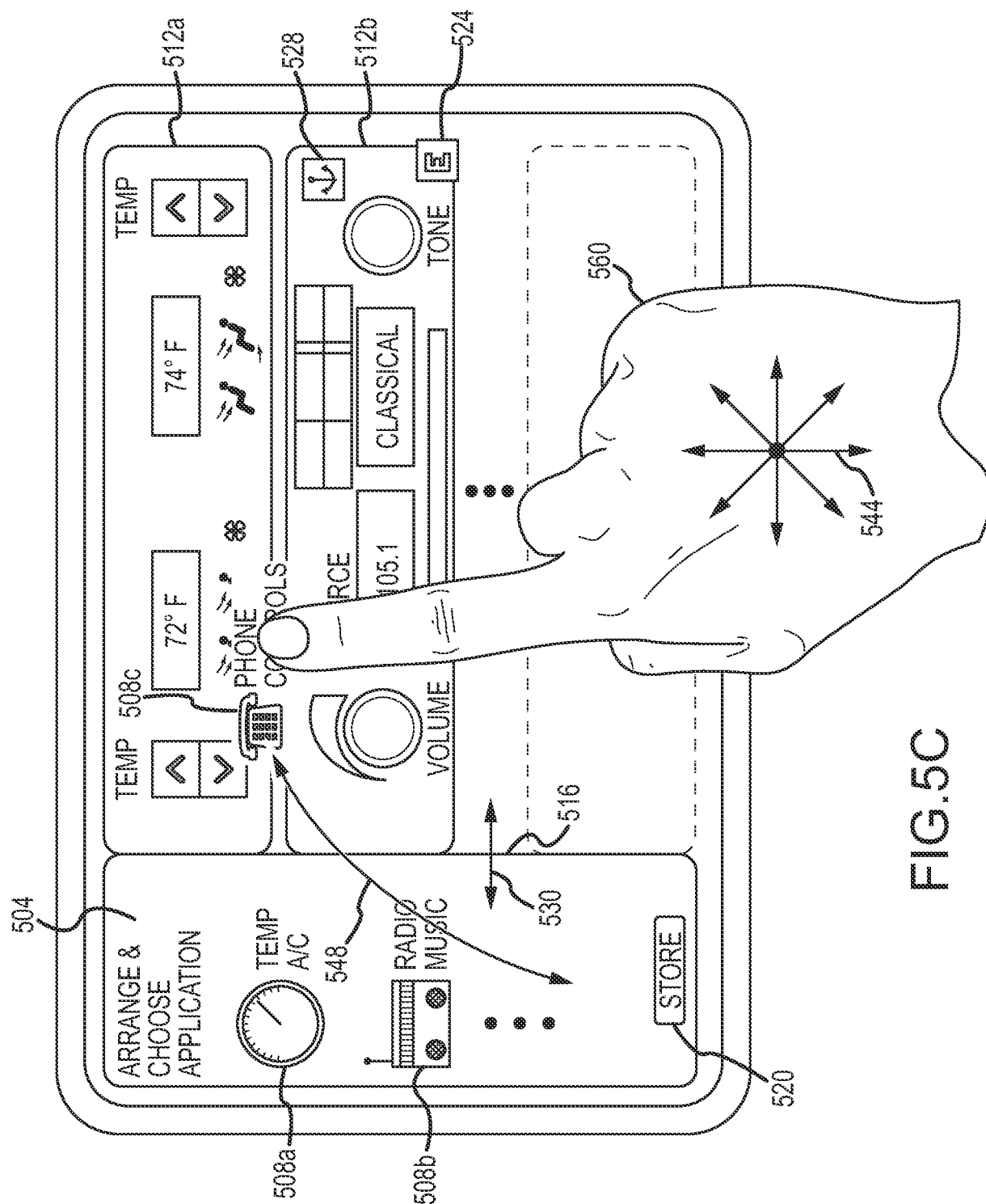


FIG. 5C

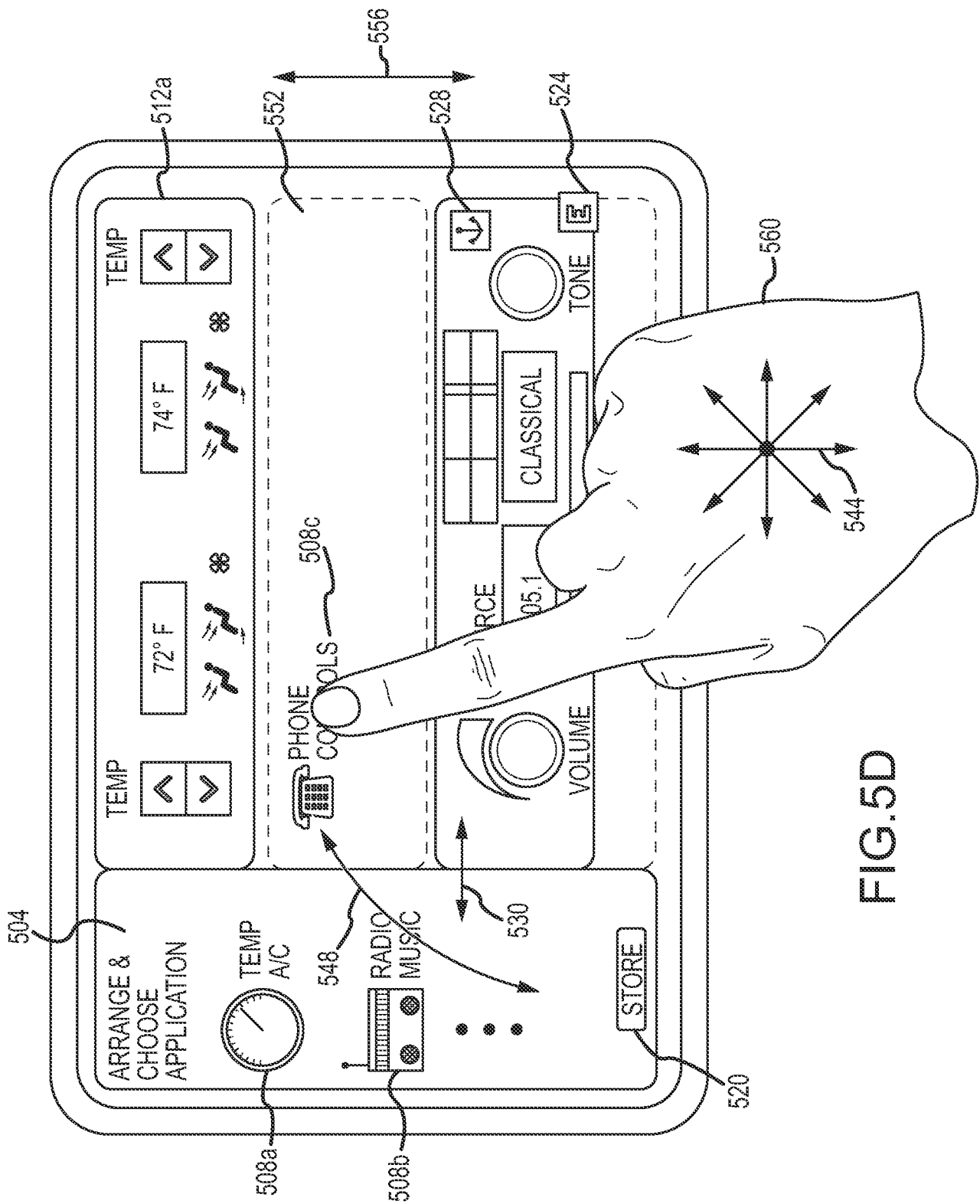
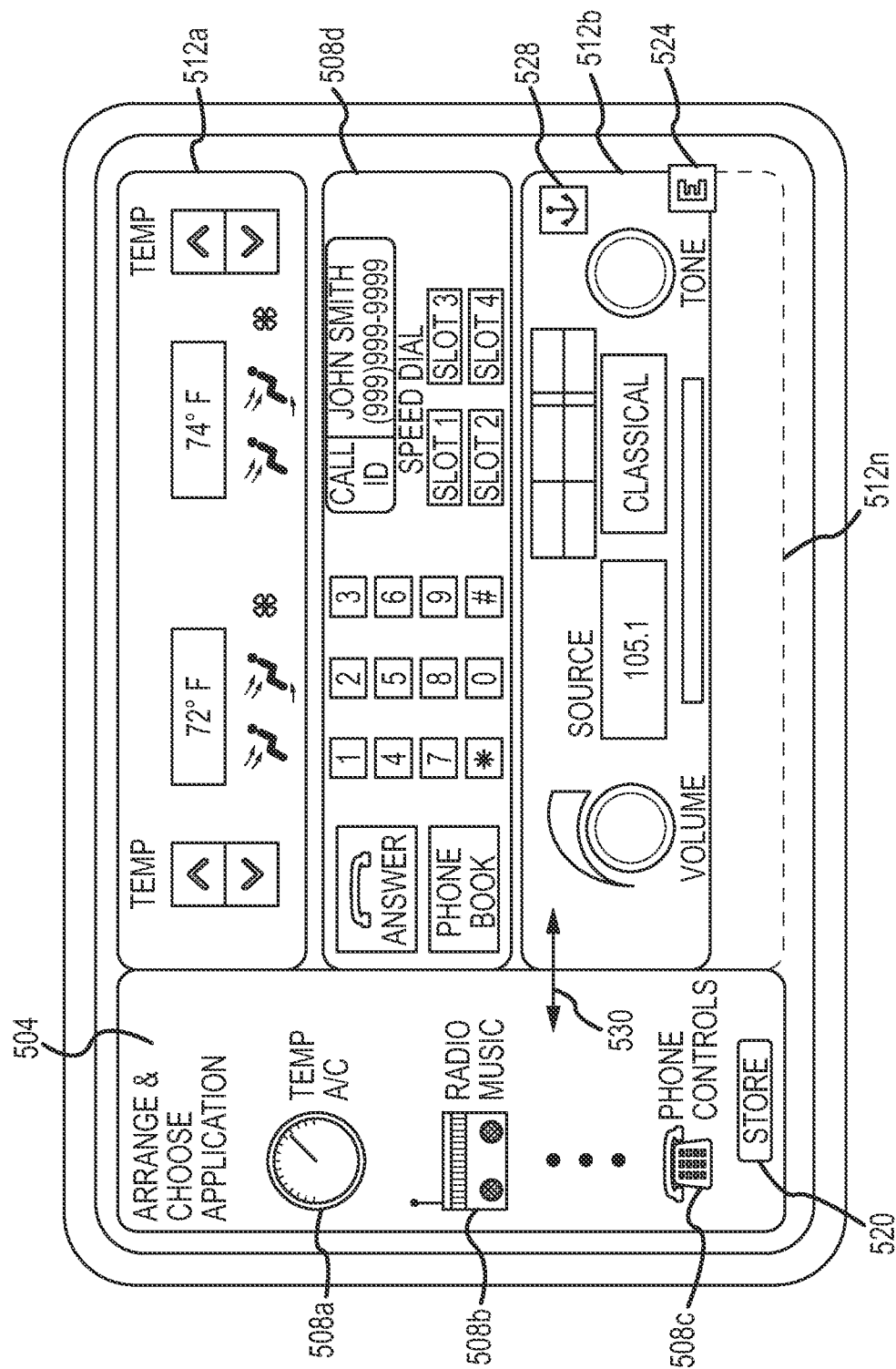
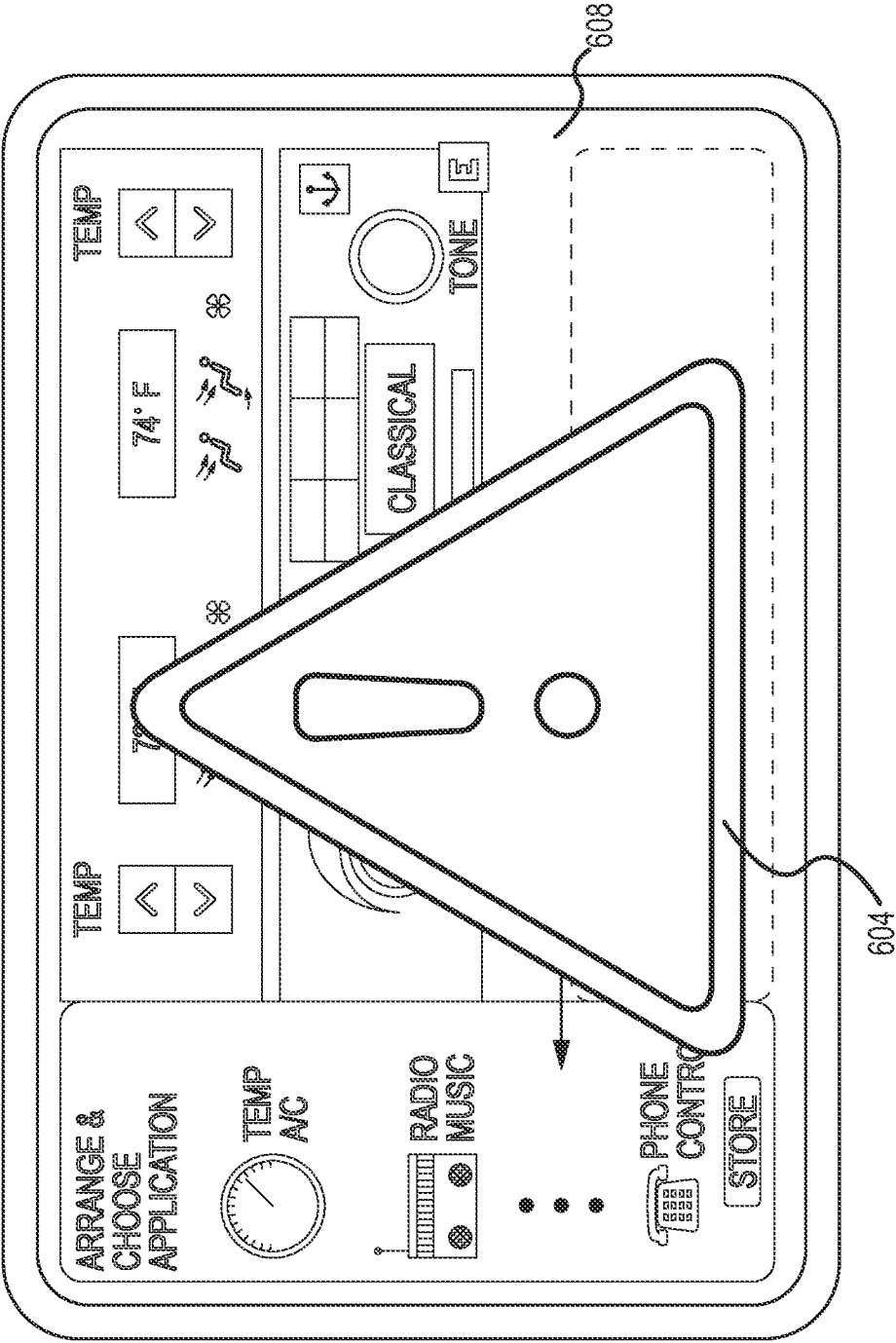


FIG. 5D



LE 5.1



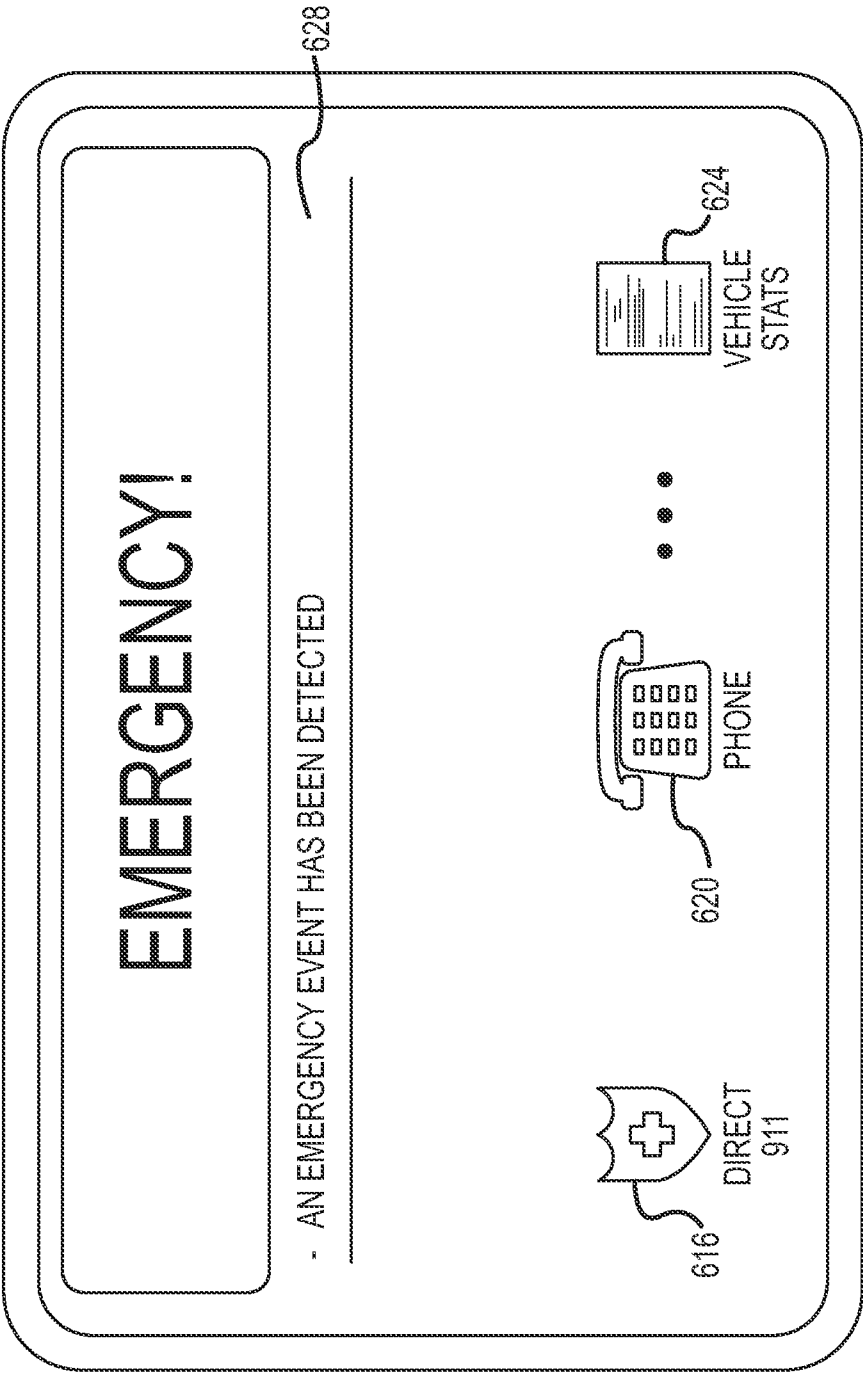


FIG.6B

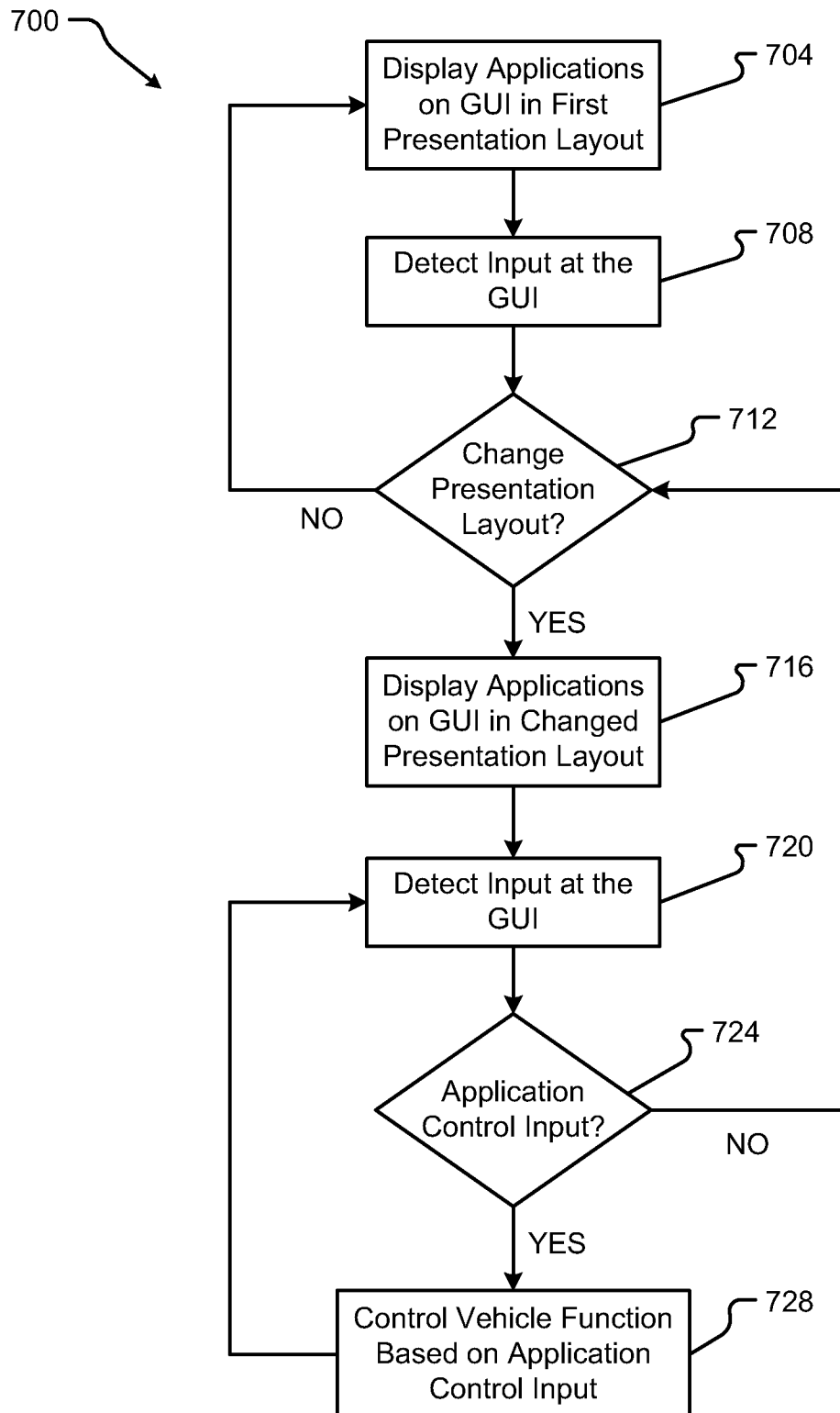


FIG. 7

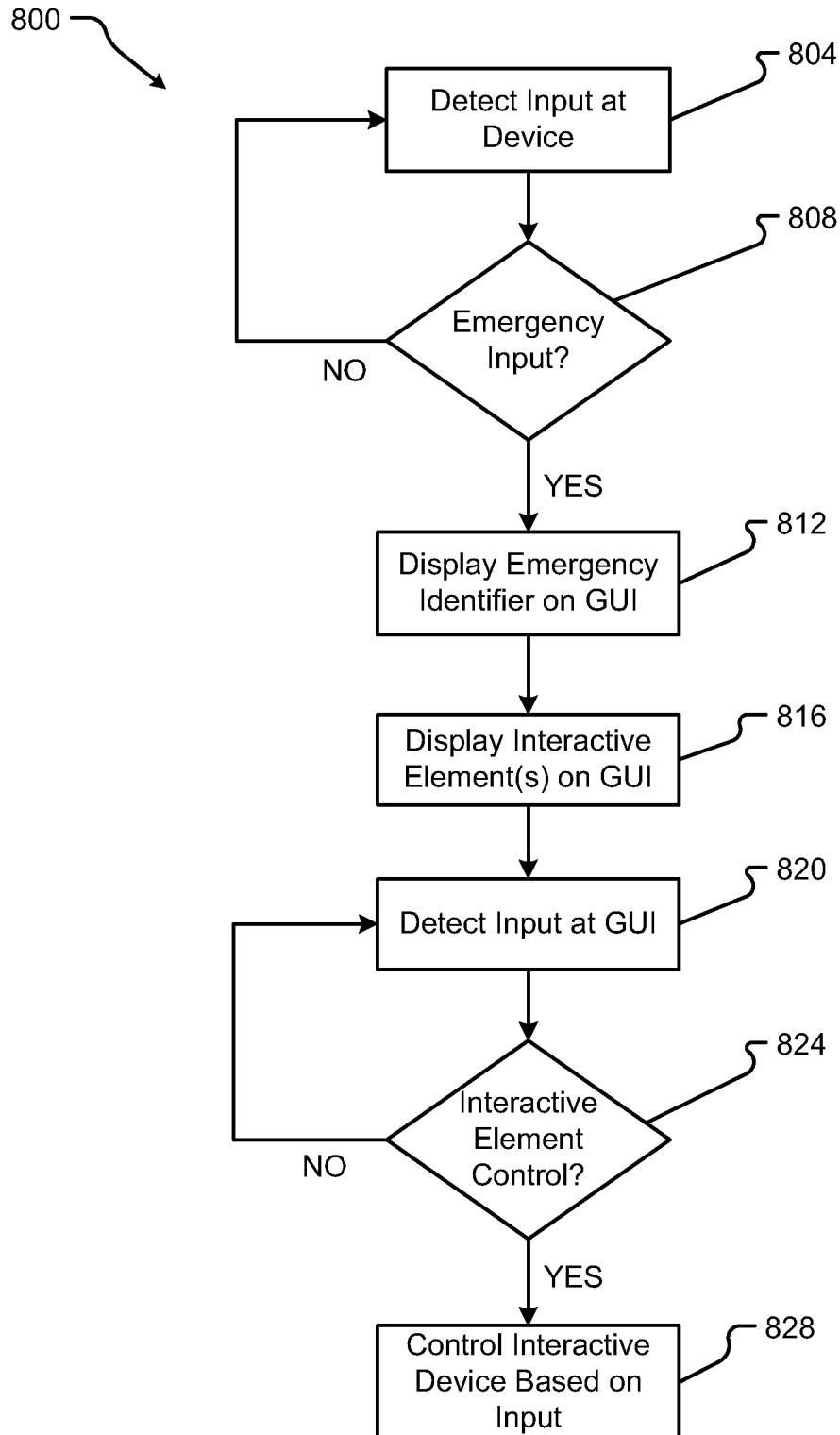


FIG. 8

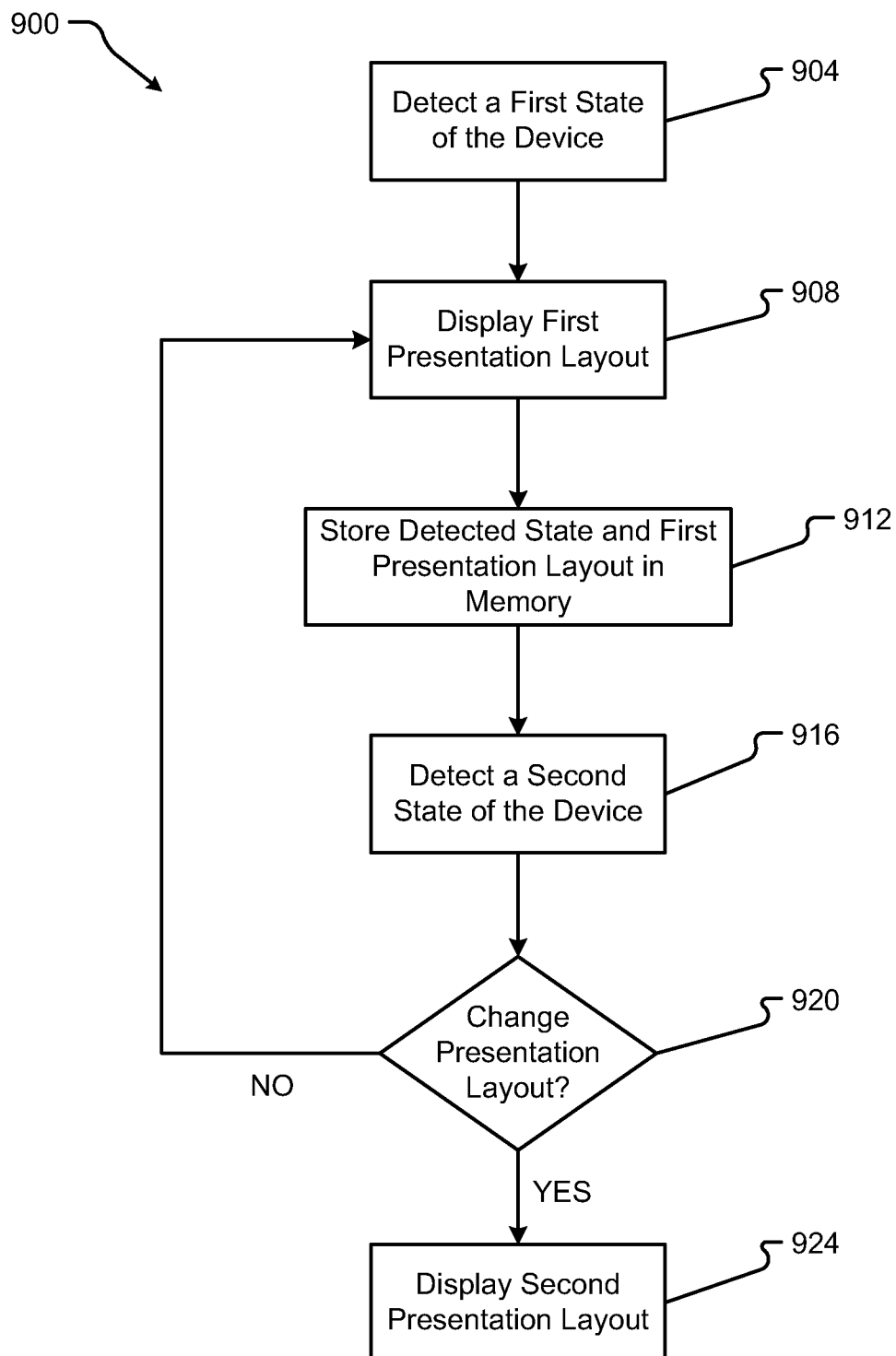


FIG. 9

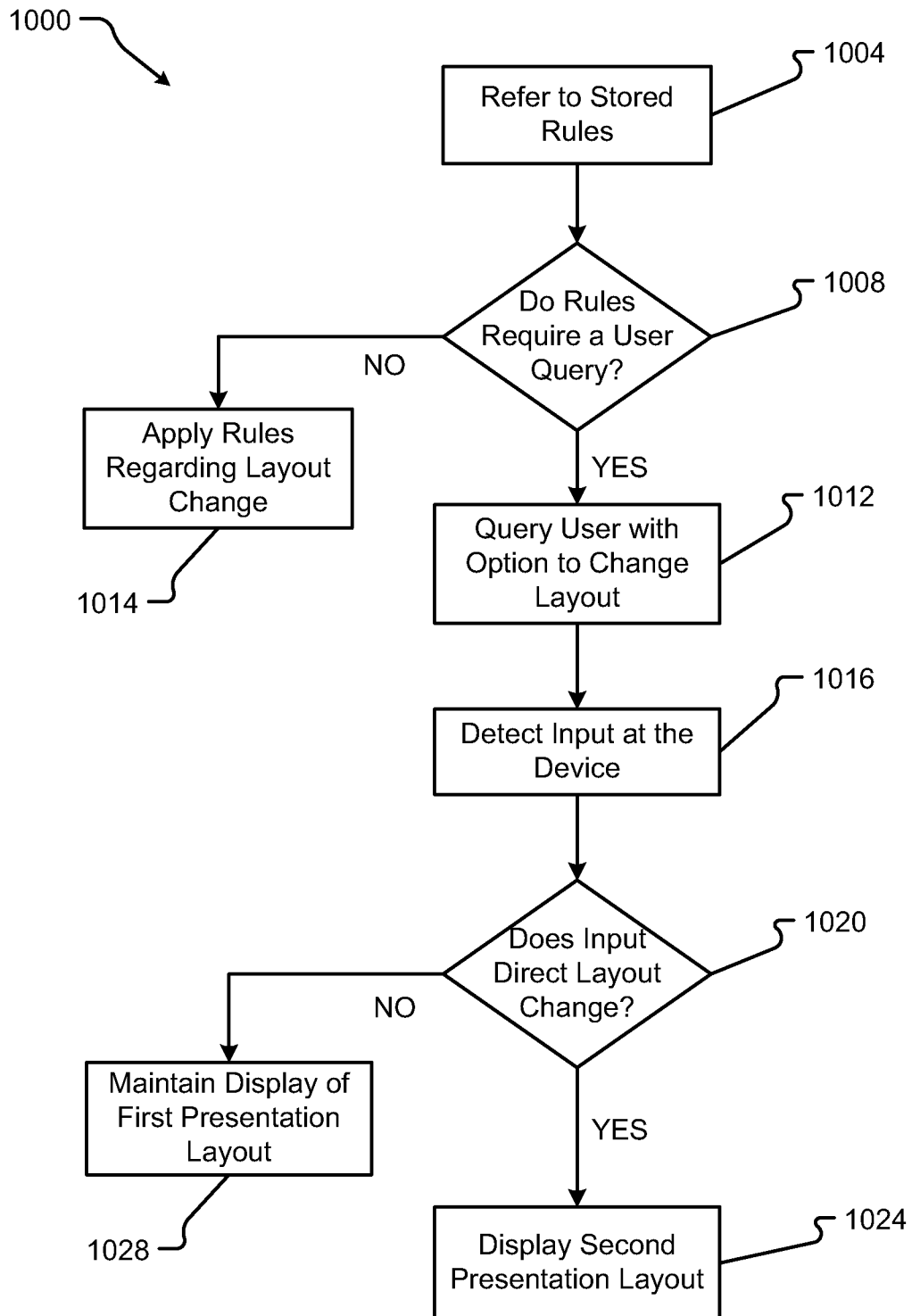


FIG. 10

1100

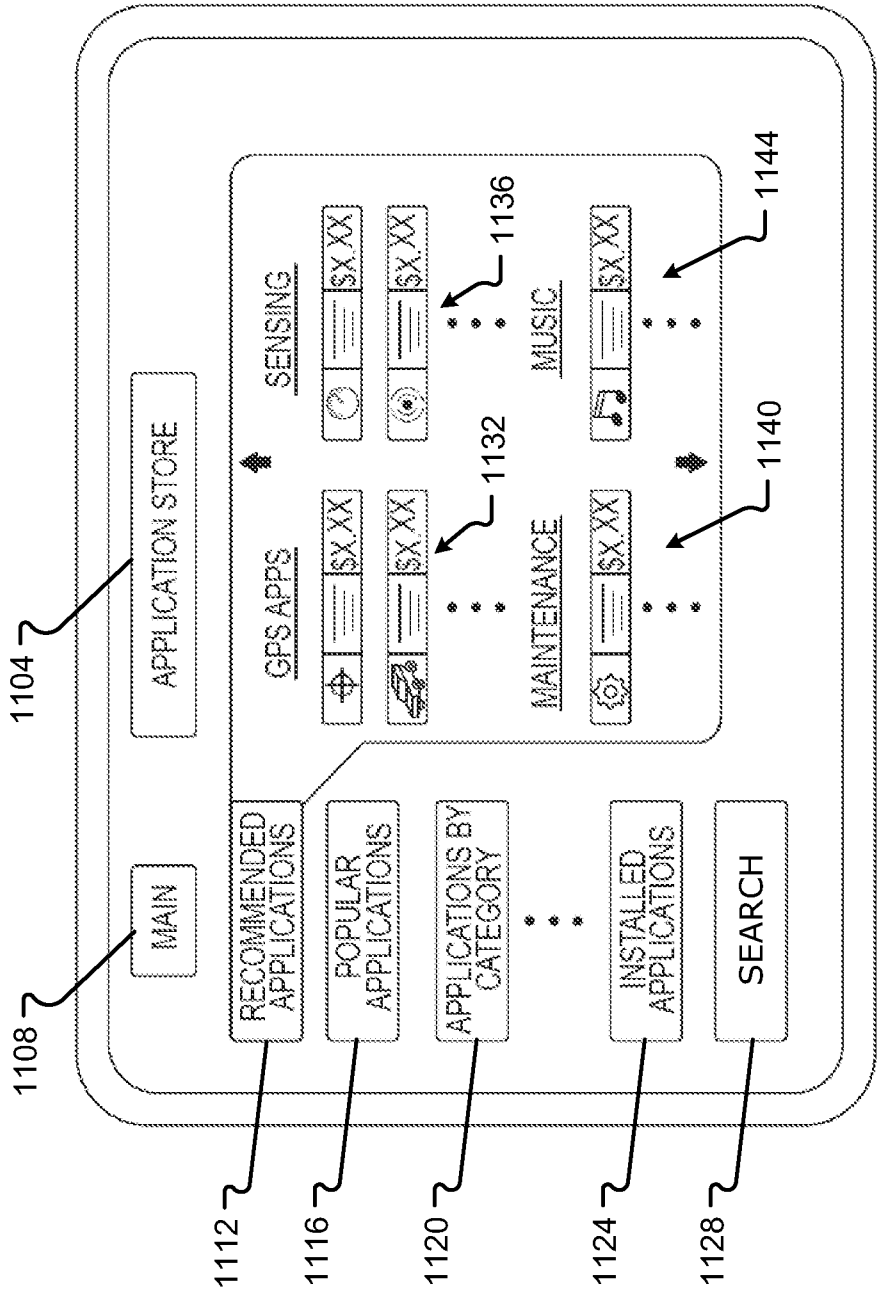


FIG. 11



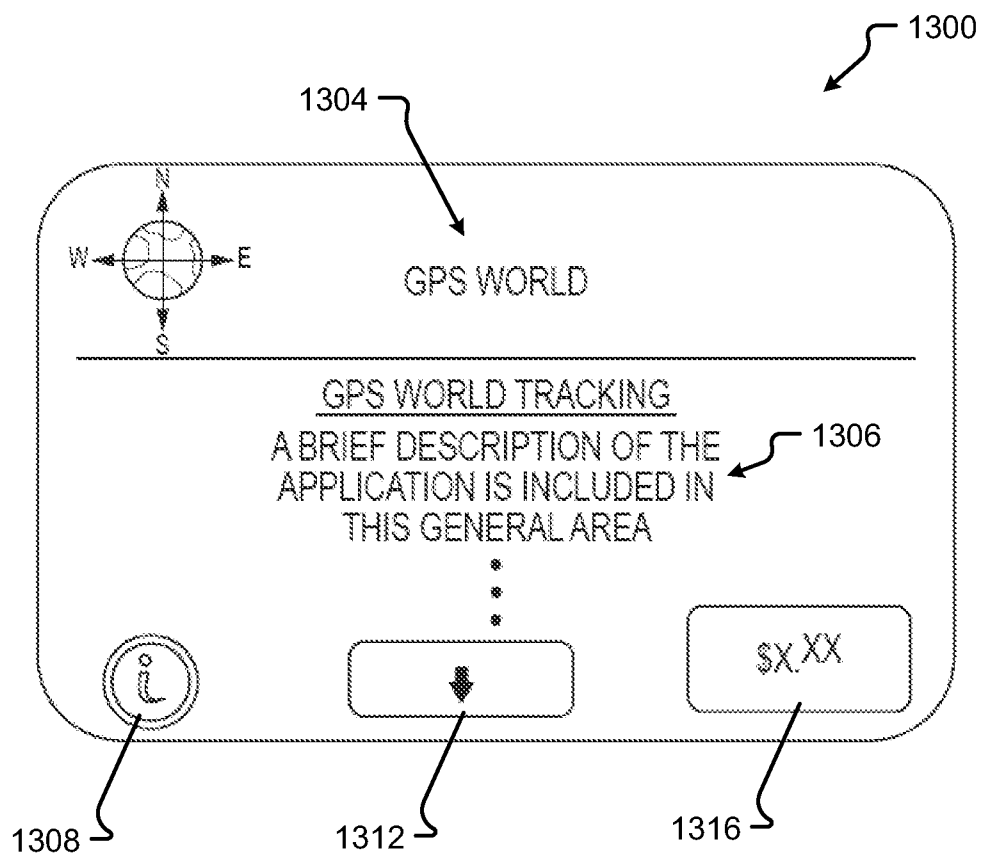


FIG. 13

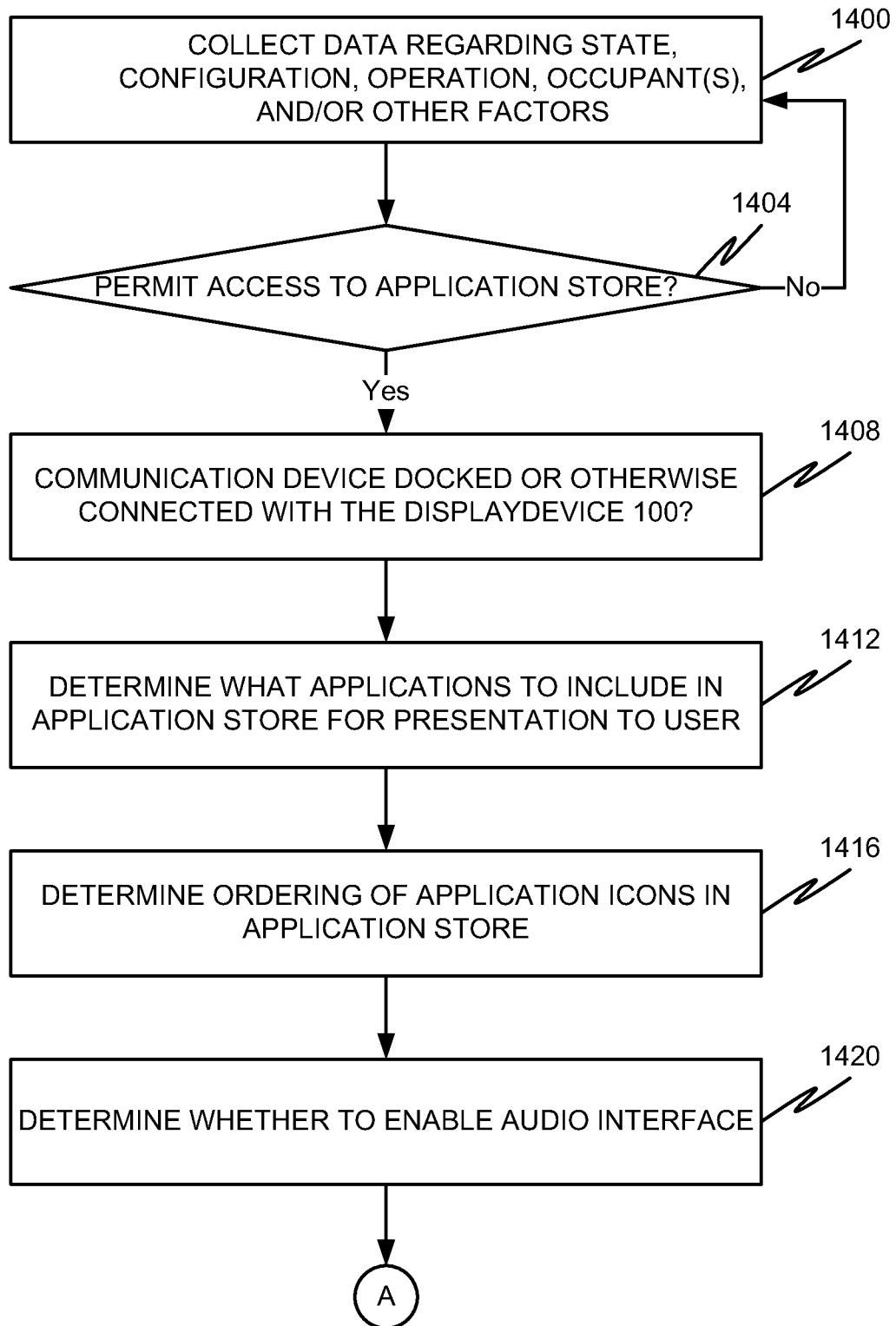


FIG. 14A

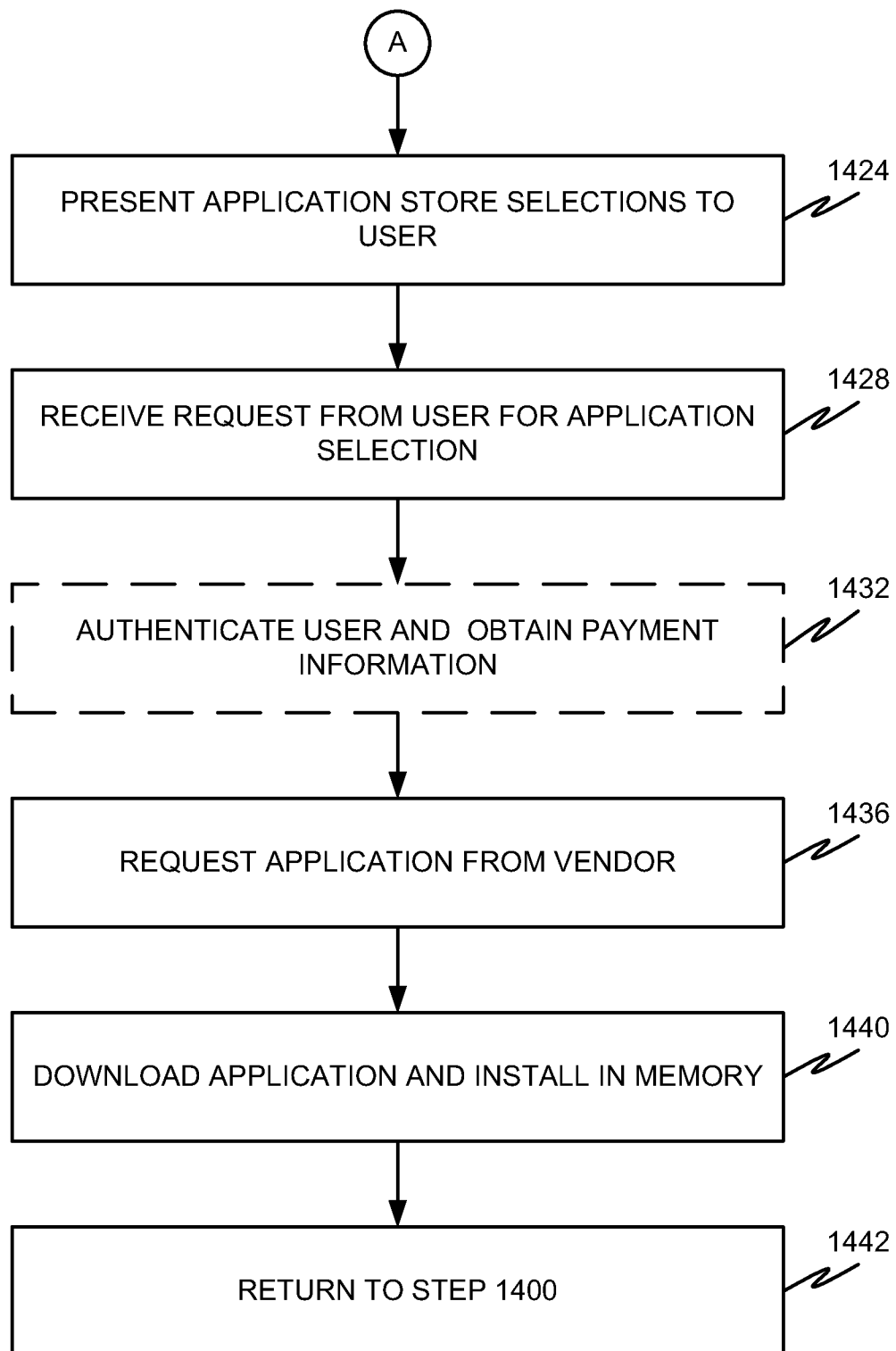


FIG. 14B

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 12/65470

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - G01C 23/00 (2013.01)

USPC - 701/418

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)  
USPC-701/418Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
USPC-701/1, 36, 40, 41, 44, 48, 400, 418, 432; 340/901, 905, 932.2, 988, 995.1, 995.26, 995.27; 700/1, 89, 90; G01C 23/00

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase; Google Patents; Google Scholar

Search terms: vehicle, car, automobile, truck, control, graphical user interface, GUI, interface, application, app, layout, presentation, display, touch screen, LCD, mount, support, latch, fasten, alter, change, modify, remove, attach, detach, portable, separate, computer

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category*       | Citation of document, with indication, where appropriate, of the relevant passages                                                         | Relevant to claim No.                                         |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| X<br>-----<br>Y | US 2011/0082615 A1 (Small et al.) 07 April 2011 (07.04.2011) entire document; fig 1-7; para [0018]-[0023], [0026]-[0028], [0034]           | 1-6, 15, 16, 19, 20<br>-----<br>7-14, 17, 18, 24, 25, 31-74   |
| X<br>-----<br>Y | US 6,816,783 B2 (Hashima et al.) 09 November 2004 (09.11.2004) entire document; fig 1, 2, 7; col 2, ln 13-31; col 3, ln 54 to col 4, ln 29 | 21, 22, 26-29<br>-----<br>23-25, 30-40, 50, 51, 61, 62, 72-74 |
| Y               | US 4,875,391 A (Leising et al.) 24 October 1989 (24.10.1989) entire document; col 108, ln 31 to col 109, ln 26                             | 7-14, 17, 18                                                  |
| Y               | US 7,881,703 B2 (Roundtree et al.) 01 February 2011 (01.02.2011) entire document; col 11, ln 1-9                                           | 23, 30                                                        |
| Y               | US 6,339,826 B2 (Hayes, Jr. et al.) 15 January 2002 (15.01.2002) entire document; col 22, ln 13 to col 23, ln 7                            | 41-74                                                         |
| Y               | US 2011/0028138 A1 (Davies-Moore et al.) 03 February 2011 (03.02.2011) entire document; para [0051]                                        | 43, 47-49, 54, 58-60, 65, 69-71                               |

☒ Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;"

document member of the same patent family

Date of the actual completion of the international search

21 February 2013 (21.02.2013)

Date of mailing of the international search report

07 MAR 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

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US 12/65470

**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------|-----------------------|
| A         | US 2010/0121570 A1 (Tokue et al.) 13 May 2010 (13.05.2010) entire document         | 1-74                  |
| A         | US 2010/0069115 A1 (Liu) 18 March 2010 (18.03.2010) entire document                | 1-74                  |
| A         | US 2005/0144156 A1 (Barber) 30 June 2005 (30.06.2005) entire document              | 1-74                  |
| A         | US 6,662,077 B2 (Haag) 09 December 2003 (09.12.2003) entire document               | 1-74                  |