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(71) Applicant *(for all designated States except US)*: **AGERE SYSTEMS INC.** [US/US]; 1110 American Pkwy Ne, Allentown, PA 18109-9137 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **WARREN, Robert, W.** [US/US]; 5518 Jordan Drive, Loveland, CO 80537 (US). **HADDAD, Stephen, N.** [US/US]; 2000 Sunset Way, Suite 7200, Longmont, CO 80501 (US). **AL-REFAEE, Fadi, Afa** [CA/US]; 20 Palatine, Irvine, CA 92612 (US). **BAHRAM, Nikolai, K.** [US/US]; 203 Bordeaux Ln., Scotts Valley, CA 95066 (US).

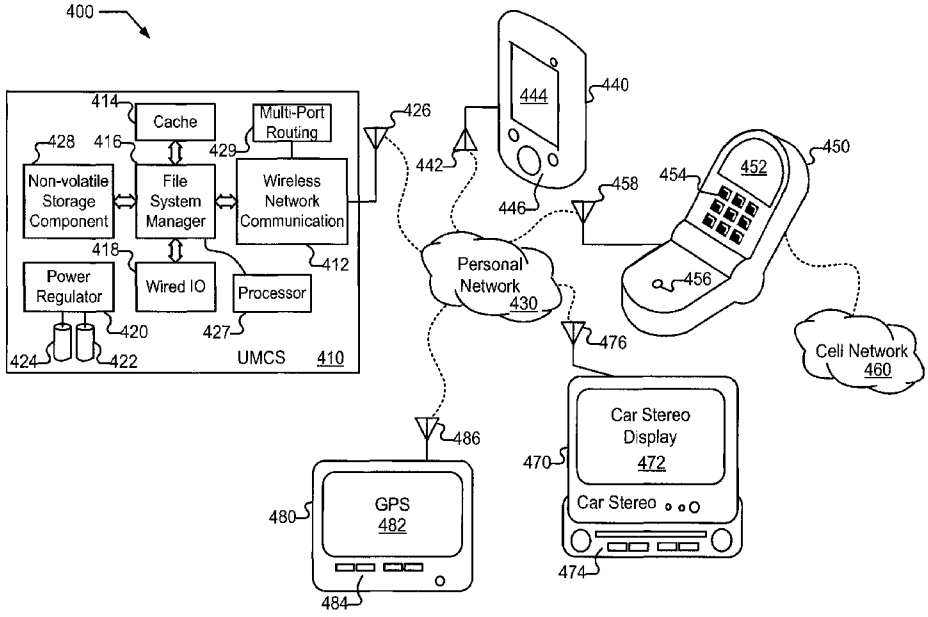
(74) Agent: **HAMILTON, Douglas, M.**; 8555 W. Belleview Ave., G21-139, Littleton, CO 80123 (US).

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(54) Title: SYSTEMS AND METHODS FOR IMPLEMENTING HANDS FREE OPERATIONAL ENVIRONMENTS



(57) Abstract: Various systems and methods for implementing operational environments are disclosed. For example, some embodiments of the present invention provide hands free operational environments that include a routing device, an audio transmission device, an audio output device, and an audio input device. The routing device communicably couples the audio transmission device to one or more of the audio input device and the audio output device. The audio input device is operable to receive an audible command. The audible command is operable to cause an operation on at least one of the routing device, the audio output device, and the audio transmission device.

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Systems and Methods for Implementing Hands Free Operational Environments

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority to (is a non-provisional filing of) US Provisional Patent Application No. 60/806,610, entitled "SYSTEMS AND METHODS FOR MOBILE DATA STORAGE AND ACQUISITION" and filed July 5, 2006 by Al-Refaee et al.; US Provisional Patent Application No. 60/829,007, entitled "SYSTEMS AND METHODS FOR MOBILE DATA STORAGE AND ACQUISITION" and filed October 11, 2006 by Al-Refaee et al.; and US Provisional Patent Application No. 60/869,453, entitled "SYSTEMS AND METHODS FOR MOBILE DATA STORAGE AND ACQUISITION" and filed December 11, 2006 by Al-Refaee et al. Each of the aforementioned applications is assigned to an entity common hereto and is incorporated herein by reference for all purposes.

[0002] Further, the present application is related to the following patent applications filed on a date even herewith: PCT Application No. _____ (Attorney Reference No. AGERE-001220PCT), entitled "Systems and Methods for Multiport Communication Distribution" and filed by Haddad et al.; PCT Application No. _____ (Attorney Reference No. AGERE-001230PCT), entitled "Systems and Methods for Power Management in Relation to a Wireless Storage Device" and filed by Warren et al.; PCT Application No. _____ (Attorney Reference No. AGERE-001240PCT), entitled "Systems and Methods for Enabling Consumption of Copy-Protected Content Across Multiple Devices" and filed by Al-Refaee et al.; PCT Application No. _____ (Attorney Reference No. AGERE-001260PCT), entitled "Systems and Methods for Multi-user Access to a Wireless Storage Device" and filed by Al-Refaee et al; and PCT Application No. _____ (Attorney Reference No. AGERE-001270PCT), entitled "Systems and Methods for Mobile Data Storage and Acquisition" and filed by Warren et al. All of the aforementioned related applications are assigned to an entity common hereto and are incorporated herein by reference for all purposes.

BACKGROUND OF THE INVENTION

[0003] The present invention is generally related to hands free operational environments, and in particular to systems and methods for implementing hands free operational environments.

[0004] A variety of consumer electronic devices may be operated either without a wired power source or using the power source of an automobile. Such consumer electronic devices may be, but are not limited to, cellular telephones, personal digital assistants, MP3 players, and car stereos. The availability of such devices has allowed many consumers to more effectively use commute time by using such devices while operating automobiles. Some people claim that the distraction resulting from using such consumer electronic devices increases the potential for automobile accidents, and indeed there is at least some evidence supporting the foregoing conclusion. Thus, to reduce the number of automobile accidents and thereby increase the safety of today's highways, some jurisdictions are proposing sever limitations on the types of consumer electronic devices that may be used while operating automobiles. Other jurisdictions are proposing limitations that require hands free operation of such consumer electronic devices while operating automobiles. While arguably increasing the safety of today's highways, the aforementioned restrictions may reduce productivity gains achieved by consumers.

[0005] Hence, for at least the aforementioned reasons, there exists a need in the art for advanced systems and methods for utilizing consumer electronic devices.

BRIEF SUMMARY OF THE INVENTION

[0006] The present invention is generally related to hands free operational environments, and in particular to systems and methods for implementing hands free operational environments.

[0007] Various embodiments of the present invention provide hands free operational environments. Such environments include a routing device, an audio transmission device, an audio output device, and an audio input device. The routing device communicably couples the audio transmission device to one or more of the audio input device and the audio output device.

The audio input device is operable to receive an audible command. The audible command is operable to cause an operation on at least one of the routing device, the audio output device, and the audio transmission device. In some instances of the aforementioned embodiments, the wireless communication network is a Bluetooth network.

[0008] In some cases of the aforementioned embodiments, the routing device is integrated with a mobile storage device that includes a processor and a memory. The memory includes a non-volatile memory component. In some particular cases, the aforementioned audible command is a request to play an audio file on the audio output device. In such a case, the memory may include software instructions executable by the processor to store the audio file in the non-volatile storage medium; to receive a request to provide the audio file to the audio output device via a wireless communication network; to access the audio file from the non-volatile storage medium; and to provide the audio file to the audio output device via the wireless communication network.

[0009] In various instances of the aforementioned embodiments, the audio transmission device is a cellular telephone, the audio output device is a car stereo, the audio input device is integrated into a personal digital assistant, and the audible command is a command to initiate a call. In such instances, upon receiving the audible input command, the personal digital assistant transfers call information to the cellular telephone. Based on the call information, the cellular telephone initiates a call. In such instances, an audio portion of the call is routed from the cellular telephone to the car stereo via the routing device. Where the car stereo is already playing an audio file or other audio stream, the audio portion of the call and the previously playing audio file are mixed after the volume of the previously playing audio is reduced. Thus, the previously playing audio may sound like background noise to the call, or may not appear at all where the volume is lowered sufficiently.

[0010] In other instances of the aforementioned embodiments, the audio transmission device is a cellular telephone, the audio output device is a car stereo, and the audible command is a command to receive an incoming call. In such instances, upon receiving the audible input command, the audio portion of the call is transferred to the car stereo via the routing device. Where the car stereo is already playing an audio file or other audio stream, the audio portion of the call and the previously playing audio file are mixed after the volume of the previously

playing audio is reduced. Thus, the previously playing audio may sound like background noise to the call, or may not appear at all where the volume is lowered sufficiently

[0011] In yet other instances of the aforementioned embodiments, the hands free operational environment further includes a location device. In such cases, the location device may receive end point coordinates from another device via the routing device, and may provide an audio command set to the audio output device via the routing device. The audio command set may be, but is not limited to, audible direction commands that are played to a user via the audio output device.

[0012] Yet other embodiments of the present invention provide methods for hands free operation. The methods include providing a routing device, and communicably coupling the routing device via a wireless network to: an audio output device, an audio input device, and an audio transmission device. The methods further include receiving an audible command via the audio input device. The audible command is operable to cause an operation on one or more of the routing device, the audio output device, and the audio transmission device. In some instances of the aforementioned embodiments, the routing device is incorporated in a mobile storage device that includes a non-volatile storage component and the audible command is a request to play an audio file. In such instances, the methods further include storing the audio file in the non-volatile storage medium; accessing the audio file from the non-volatile storage medium; and providing the audio file to the audio output device via the wireless communication network. In some instances of the aforementioned embodiments, the wireless communication network is a Bluetooth network. In one or more instances of the aforementioned methods, the methods further include communicably coupling the routing device via the wireless network to a location device, and receiving an audio command set from the location device at the audio output device. This audio command set may then be played using the audio output device.

[0013] In other instances of the aforementioned methods, the audio transmission device is a cellular telephone, the audio output device is a car stereo, and the audible command is a command to receive a call. In such instances, the methods further include routing an audio portion of the call from the cellular telephone to the car stereo via the routing device. In further instances of the aforementioned embodiments, the methods further include reducing the volume

of an audio file previously playing on the car stereo; and playing the audio portion of the call at a volume greater than that of the previously playing audio file.

[0014] In yet other instances of the aforementioned methods, the audio transmission device is a cellular telephone, the audio output device is a car stereo, the audio input device is integrated into a personal digital assistant, and the audible command is a command to initiate a call. In such instances, the methods further comprise: transferring call information to the cellular telephone from the personal digital assistant upon receiving the audible input command. In addition, the cellular telephone initiates a call using the call information, and an audio portion of the call from the cellular telephone is routed to the car stereo via the routing device. In some particular instances of the aforementioned embodiments, the audio portion of the call is overlaid on a previously playing audio file on the car stereo.

[0015] Yet other embodiments of the present invention provide systems for implementing a hands free automobile environment. Such systems include a mobile storage device. The mobile storage device includes a routing function, a memory with a non-volatile memory component, and a processor. The memory includes software executable by the processor to: communicably couple the mobile storage device to a cellular telephone, a car stereo, and an audio input device via a Bluetooth network; and to route audio information from the mobile storage device to the car stereo based at least in part on the received audible command. In some instances, the received audible command is a request to play an audio file, and the memory further includes software executable by the processor to: store the audio file in the non-volatile storage medium; access the audio file from the non-volatile storage medium; and provide the audio file to the audio output device via the wireless communication network. In other instances, the received audible command is a request to receive a call, and the memory further includes software executable by the processor to: transfer a derivative of the received audible command to the cellular telephone; receive an audio portion of the call from the cellular telephone; and route the audio portion of the cellular telephone to the car stereo via the Bluetooth network. In yet other instances, the received audible command is a request to initiate a call, and the memory further includes instructions executable by the processor to: transfer a derivative of the received audible command to the cellular telephone; receive an audio portion of the call from the cellular

telephone; and route the audio portion of the cellular telephone to the car stereo via the Bluetooth network.

[0016] This summary provides only a general outline of some embodiments according to the present invention. Many other objects, features, advantages and other embodiments of the present invention will become more fully apparent from the following detailed description, the appended claims and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] A further understanding of the various embodiments of the present invention may be realized by reference to the figures which are described in remaining portions of the specification. In the figures, like reference numerals are used throughout several to refer to similar components. In some instances, a sub-label consisting of a lower case letter is associated with a reference numeral to denote one of multiple similar components. When reference is made to a reference numeral without specification to an existing sub-label, it is intended to refer to all such multiple similar components.

[0018] Fig. 1 depicts various UMCS devices in accordance with some embodiments of the present invention;

[0019] Fig. 2 depicts an exemplary UMCS device in accordance with some embodiments of the present invention;

[0020] Fig. 3 shows a multiport Bluetooth data distribution system in accordance with some embodiments of the present invention;

[0021] Fig. 4 shows an exemplary operational environment in accordance with various embodiments of the present invention;

[0022] Fig. 5 is a flow diagram showing a method in accordance with one or more embodiments of the present invention for implementing a hands free operational environment; and

[0023] Figs. 6-9 show other exemplary operational environments in accordance with one or more other embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0024] The present invention is generally related to hands free operational environments, and in particular to systems and methods for implementing hands free operational environments.

[0025] Various embodiments of the present invention provide hands free operational environments. Such environments include a routing device, an audio transmission device, an audio output device, and an audio input device. As used herein, the phrase "routing device" is used in its broadest sense to mean any device capable of receiving signals from one or more separate devices, and for transmitting those signals to one or more recipient devices. Thus, a routing device may be, but is not limited to, a multiport Bluetooth router as disclosed in the patent application entitled "Systems and Methods for Multiport Communication Distribution" that was previously incorporated herein by reference for all purposes. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of routing devices that may be employed in relation to one or more embodiments of the present invention. As used herein, the phrase "audio transmission device" is used in its broadest sense to mean any device capable of transmitting an audio file or signal. Thus, for example, an audio transmission device may be, but is not limited to an analog cellular telephone or a digital cellular telephone. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of audio transmission devices that may be employed in relation to one or more embodiments of the present invention. As used herein, the phrase "audio output device" is used in its broadest sense to mean any device capable of producing an audible output. Thus, an audio output device may be, but is not limited to an analog speaker. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of audio output devices that may be used in relation to various embodiments of the present invention. As used herein, the phrase "audio input device" is used in its broadest sense to mean any device capable of detecting an audible input. Thus, an audio input device may be, but is not limited to a microphone. Based on the

disclosure provided herein, one of ordinary skill in the art will recognize a variety of audio input devices that may be used in relation to various embodiments of the present invention.

[0026] The routing device communicably couples the audio transmission device to one or more of the audio input device and the audio output device. The audio input device is operable to receive an audible command. The audible command is operable to cause an operation on at least one of the routing device, the audio output device, and the audio transmission device. In some instances of the aforementioned embodiments, the wireless communication network is a Bluetooth network.

[0027] In some cases of the aforementioned embodiments, the routing device is integrated with a mobile storage device that includes a processor, and a memory. The memory includes a non-volatile memory component. As used herein, the phrase "non-volatile memory component" is used in its broadest sense to mean any memory element that is capable of retaining its contents after power is removed from the device in which the non-volatile memory component is implemented. Thus, for example, a non-volatile memory component may include, but is not limited to, a hard disk drive, a flash memory, a self powered DRAM module, combinations of the aforementioned, or the like. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of non-volatile memory components that may be used in relation to one or more embodiments of the present invention. In some particular cases, the aforementioned audible command is a request to play an audio file on the audio output device. In such a case, the memory may include software instructions executable by the processor to store the audio file in the non-volatile storage medium; to receive a request to provide the audio file to the audio output device via a wireless communication network; to access the audio file from the non-volatile storage medium; and to provide the audio file to the audio output device via the wireless communication network.

[0028] In various instances of the aforementioned embodiments, the audio transmission device is a cellular telephone, the audio output device is a car stereo, the audio input device is integrated into a personal digital assistant, and the audible command is a command to initiate a call. In such instances, upon receiving the audible input command, the personal digital assistant transfers call information to the cellular telephone. Based on the call information, the cellular telephone initiates a call. In such instances, an audio portion of the call is routed from the cellular

telephone to the car stereo via the routing device. Where the car stereo is already playing an audio file or other audio stream, the audio portion of the call and the previously playing audio file are mixed after the volume of the previously playing audio is reduced. Thus, the previously playing audio may sound like background noise to the call, or may not appear at all where the volume is lowered sufficiently.

[0029] In other instances of the aforementioned embodiments, the audio transmission device is a cellular telephone, the audio output device is a car stereo, and the audible command is a command to receive an incoming call. In such instances, upon receiving the audible input command, the audio portion of the call is transferred to the car stereo via the routing device. Where the car stereo is already playing an audio file or other audio stream, the audio portion of the call and the previously playing audio file are mixed after the volume of the previously playing audio is reduced. Thus, the previously playing audio may sound like background noise to the call, or may not appear at all where the volume is lowered sufficiently

[0030] In yet other instances of the aforementioned embodiments, the hands free operational environment further includes a location device. As used herein, the phrase "location device" is used in its broadest sense to mean any device capable of determining the location of a mobile object or device. Thus, for example, a location device may be, but is not limited to a GPS based device that provides information about the location of the GPS based device and in some cases provided information about how to proceed to a destination from the current location. In such cases, the location device may receive end point coordinates from another device via the routing device, and may provide an audio command set to the audio output device via the routing device. The audio command set may be, but is not limited to, audible direction commands that are played to a user via the audio output device.

[0031] Turning to Fig. 1, a diagram depicts an exemplary content usage network 100 in accordance with various embodiments of the present invention. Exemplary content usage network 100 includes a UMCS 110 at the core thereof. UMCS 110 is able to receive content from one or more online and wireless content providers as well as from various self maintained application devices such as, for example, audio recorders and video recorders. In some cases, UMCS 110 may be intermittently wired to a personal computer 115 via a cable 117. In such

cases, UMCS 110 may be configured via personal computer 115 using the standard I/O interfaces associated with personal computer 115.

[0032] Wireless network 120 may be any wireless network known in the art. Thus, for example, wireless network 120 may be, but is not limited to, a Bluetooth™ network as is known in the art. As indicated above, the word "Bluetooth" is a trademark of Bluetooth SIG, Inc. For clarity, later use of the word Bluetooth is done without the customary trademark designation. It should be noted that while UMCS 110 may be configured across wireless network 120 using the user interface of another application device, and it may also be configured using other approaches. Thus, for example, UMCS 110 may be self configuring. In such a case, UMCS 110 is implemented with enough intelligence to auto detect an available wireless network as well as devices attached via the wireless network. As a particular example, UMCS 110 may be implemented such that when power is applied to the device it automatically scans for Bluetooth devices that are within range of UMCS 110. Based on the detected Bluetooth devices, UMCS 110 may form a service offering as is more fully discussed below.

[0033] UMCS 110 is capable of interacting with various devices and classes of devices via wireless network 120. For example, in some cases, UMCS 110 is operable to interact directly with UMCS enabled application devices via wireless network 120. Such UMCS enabled application devices include capability to authenticate to UMCS 110 and to accept and transfer information from/to UMCS 110, and to provide digital rights management whereby content is secured not only in the transfer between UMCS 110 and the UMCS enabled application device, but is also maintained secure within the UMCS enabled application device. In the situation where wireless network 120 is a Bluetooth network, the aforementioned UMCS enabled application devices would include Bluetooth capability.

[0034] In various cases, UMCS 110 is operable to interact directly with non-UMCS enabled application devices via wireless network 120. In such cases, either UMCS 110 includes capability to tailor output and receive input from the non-UMCS enabled application device, or the non-UMCS enabled application devices may interact with UMCS 110 via a specialized UMCS converter that is tailored for operation with a class of devices. Thus, for example, where wireless network 120 is a Bluetooth network, the UMCS converter may be enabled to receive from and provided information to a non-UMCS enabled application device via any one of a

number of communication approaches, and to communicate the information to/from UMCS 110 using a Bluetooth protocol. As an example, UMCS 110 may interact with digital audio devices (e.g., a digital audio player 151 and a digital audio recorder 152) via a UMCS digital audio converter 150. As another example, a cellular telephone 161 or personal digital assistant (not shown) may interact with UMCS 110 either directly or via a UMCS audio/video converter 160. As yet another example, UMCS 110 may interact with video devices (e.g., a set top box 166, a video cassette player 167, a digital video recorder 168 and a television 169) via a UMCS digital video converter 165. As yet a further example, UMCS 110 may interact with still image devices such as a digital still camera 171 or a printer (not shown) via a UMCS digital image converter 170. As yet another example, UMCS 110 may interact with a GPS receiver/display 176 via a UMCS GPS converter 175.

[0035] In various cases, UMCS 110 is operable to interact directly with non-UMCS enabled application devices via a UMCS composite converter 140. UMCS composite converter 140 is operable to provide for UMCS interaction with multiple classes of recipient devices. Thus, for example, where wireless network 120 is a Bluetooth network, UMCS composite converter 140 may be enabled to receive from and provided information to different classes of non-UMCS enabled application devices via any one of a number of communication approaches, and to communicate the information to/from UMCS 110 using a Bluetooth protocol. As an example, UMCS composite converter 140 may couple UMCS 110 to, for example, a digital audio player 141, a digital video recorder 142, a television 143, a set top box 144, a digital still camera 145, a video cassette player 146, a digital audio recorder 147, a cellular telephone 148, and a GPS receiver 149, or some combination of the aforementioned device classes. In such cases, decoding of content accessed from a storage medium included in UMCS 110 is done using a decoder provided in UMCS composite converter 140. Thus, the content is unwrapped by UMCS 110 and the unwrapped content is provided to the UMCS composite converter 140 via wireless network 120. UMCS composite converter 140 decodes the content and provides it to the appropriate recipient device while at the same time assuring that any demanded digital rights management is maintained. In some cases, UMCS composite converter 140 may be implemented as a dongle associated with one or more recipient devices.

[0036] Further discussion of content usage networks including UMCS devices is provided in the patent application entitled "Systems and Methods for Mobile Data Storage and Acquisition" that was previously incorporated herein by reference for all purposes.

[0037] Turning to Fig. 2, an exemplary UMCS 200 in accordance with some embodiments of the present invention is depicted. As shown, UMCS 200 includes a storage component 210. Storage component 210 may be, but is not limited to, a hard disk drive, a block of flash memory, Holographic memory, Random Access Memory, combinations of the aforementioned, and/or the like. Based on the disclosure provided herein, one of ordinary skill in the art will recognize other memory types that may be utilized in accordance with various embodiments of the present invention. UMCS 200 further includes a file system manager 220 that is operable to control reads from and writes to storage component 210. UMCS 200 includes a Bluetooth wireless interface. Bluetooth wireless interfaces provide for short-range communications intended to replace the cables connecting portable and/or fixed electronic devices. The key advantages of Bluetooth wireless interfaces are robustness, low power, and low cost. A typical Bluetooth interface includes an antenna 290 that operates as an RF transceiver, a baseband protocol processor 240, and a Bluetooth enhanced data rate PHY 250. A Bluetooth interface offers services that enable the connection of Bluetooth enabled devices, and the exchange of a variety of data classes between the connected devices. The Bluetooth interface includes one or more Bluetooth ports and software/firmware that allows UMCS 200 to operate as a hub/router for all connections in and out of storage component 210, and as more fully described below, as a hub/router for a variety of connected Bluetooth devices that may or may not interact with storage component 210. UMCS 200 may also be configured via the above mentioned Bluetooth interface.

[0038] UMCS 200 also includes a flash or SDRAM cache 230 that may be used to reduce latency in accessing storage component 210. Where storage component 210 is implemented in Flash or SDRAM, cache 230 may be eliminated. The combination of storage component 210 and a flash cache may be used to reduce power consumption by UMCS 200. Various approaches for reducing power consumption are discussed in the patent application entitled "Systems and Methods for Power Management in Relation to a Wireless Storage Device" that was previously incorporated herein by reference for all purposes. Yet further, UMCS 200 includes a USB port

260 that allows for access to storage component 210 and/or configuration of UMCS 200. UMCS 200 may also include a power controller 270 and a mobile power source 280. Baseband protocol processor 240 may include ports and software/firmware that allows it to operate as a hub/router for all connections in and out of storage component 210.

[0039] In some embodiments of the present invention, UMCS 200 is augmented to include a multiport Bluetooth router. Such a multiport Bluetooth router allows for the cross connect of a number of Bluetooth devices. This can be particularly useful where a number of single port Bluetooth devices are to be used together in an overall system. Thus, as just one example, a typical cellular telephone includes a Bluetooth interface capable of connecting to a single Bluetooth device at a time. This interface has traditionally been used to transfer audio data to/from a single a headset. It may be desirable, however, to not only transfer audio data to/from a headset, but to also provide an audio output to a car stereo, and to receive dialing information from a personal digital assistant. Such a configuration is not practical as the above mentioned cellular telephone can only support one single Bluetooth connection at a time, and changing between devices connected via the single Bluetooth port is cumbersome. Where the multiport Bluetooth router is incorporated into UMCS 200, UMCS 200 may be connected to the cellular telephone via one Bluetooth protocol interface supported by UMCS 200, and that Bluetooth protocol interface may be cross connected to one or more other Bluetooth protocol interfaces that are in turn connected to respective Bluetooth devices. This allows for practical implementation the above mentioned exemplary configuration involving the cellular telephone, car stereo and personal digital assistant. Among other things, such an approach offers an advantage in a wireless communications market skewing toward low-priced, basic-featured cellular telephones. Based on the disclosure provided herein, one of ordinary skill in the art will recognize other applications for multiport Bluetooth routers in accordance with one or more embodiments of the present invention. Further, it should be noted that while multiport Bluetooth routers in accordance with various embodiments of the present invention may be incorporated with a UMCS device, other embodiments of the present invention provide multiport Bluetooth routers that do not include one or more features of a UMCS device as described herein.

[0040] Turning to Fig. 3, a multiport Bluetooth router 300 in accordance with one or more embodiments of the present invention is depicted. As previously discussed, multiport Bluetooth

router 300 may be integrated into a UMCS device. Alternatively, multiport Bluetooth router 300 may be integrated into another electronic device, or may be developed as a stand alone device. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of uses and implementations for multiport Bluetooth router 300. Multiport Bluetooth router 300 includes a number of Bluetooth pipes 340, 343, 345, 347 that are each coupled to a multiport processor 330. Each of the Bluetooth pipes includes a Bluetooth protocol interface that allows for the transfer of data to/from a connected Bluetooth device. For example, Bluetooth pipe 343 is communicably coupled to a Bluetooth source/destination 313. As used herein, a "Bluetooth source/destination" is any device that is capable of transferring data to and/or from another Bluetooth device. Similarly, Bluetooth pipe 345 is communicably coupled to a Bluetooth source/destination 315, and Bluetooth pipe 347 is communicably coupled to a Bluetooth source/destination 317. Bluetooth pipe 340 is communicably coupled to a single port Bluetooth device 310. As used herein, a "single port Bluetooth device" is any device that supports connection with only one other Bluetooth device at a time. An example of such a single port device is a low cost cellular telephone that is implemented with only a single Bluetooth port. As will be appreciated by one of ordinary skill in the art upon reading this disclosure, low cost single port Bluetooth devices may be extended to function as multiport Bluetooth devices where a stand alone multiport Bluetooth router/hub is used in concert with the single port device. It should be noted that while multiport Bluetooth router 300 is shown with four Bluetooth pipes, that other implementations of a multiport Bluetooth router may be implemented with more than four or fewer than four Bluetooth pipes in accordance with different embodiments of the present invention. Various exemplary implementations and operational details of such multiport Bluetooth routers are provided in the patent application entitled "Systems and Methods for Multiport Communication Distribution" that was previously incorporated herein by reference for all purposes.

[0041] Turning to Fig. 4, an operational environment 400 in accordance with one or more embodiments of the present invention is depicted. Operational environment 400 includes a UMCS 410, a Global Positioning System (GPS) based location device 480, a car stereo 470, a cellular telephone 450, and a personal digital assistant 440 that are all communicably coupled via a personal network 430. In some embodiments of the present invention, personal network 430 is a Bluetooth network and UMCS 410 includes a multiport Bluetooth router as discussed above in

relation to Fig. 3. In other embodiments of the present invention, personal network 430 may be another wireless network such as, for example, a Wi-Fi network or the like. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of network types and/or combinations of network types that may be used to implement personal network 430 in accordance with one or more embodiments of the present invention.

[0042] UMCS 410 includes a wireless network communication interface 412 that communicates via personal network 410 via an antenna. The wireless communications may include transferring data to/from a memory system that includes a non-volatile storage component 428 via a file system manager 416. A processor 427 may govern access to the memory system. Non-volatile storage component 428 may include, but is not limited to, flash memory and a hard disk drive. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of non-volatile storage types that may be used in relation to one or more embodiments of the present invention. In addition to accessing non-volatile storage component 428 via wireless interface 412, non-volatile storage component 428 may also be accessed using wired IO 418 such as, for example, a wired USB interface. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of wired IO that may be implemented in relation to UMCS 410. UMCS 410 also includes a cache 414 that may be used to reduce latency and/or power consumption. Some approaches for reducing power consumption are more fully described in the patent application entitled "Systems and Methods for Power Management in Relation to a Wireless Storage Device" that was previously incorporated herein by reference for all purposes. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of cache systems and other memory systems that may be incorporated into one or more embodiments of the present invention. UMCS 410 also includes a multiport router 429 that is capable of directing traffic between a variety of consumer electronic devices communicably coupled to personal network 430. Where personal network 430 is a Bluetooth network, multiport router 429 may be implemented as is more fully discussed in the application entitled "Systems and Methods for Multiport Communication Distribution" that was previously incorporated herein by reference for all purposes.

[0043] Location device 480 may be any location device known in the art including, but not limited to, a portable GPS based location device. Location device 480 includes an IO interface

484 with one or more buttons or knobs and possibly a speaker for audibly presenting an audio command set to a user. In addition, location device 480 includes a graphical user interface 482 capable of displaying location and direction information to a user. Location device 480 also includes an antenna 486 for communicating via personal network 430. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of location devices that may be used in relation to one or more embodiments of the present invention.

[0044] Car stereo 470 may be any car audio device known in the art. In this particular instance, car stereo 470 includes an IO interface 474 with one or more buttons or knobs and possibly a microphone for receiving audible commands from a user. In addition, car stereo 470 includes a graphical user interface 472 capable of displaying audio play information, video presentation, and other graphical information to a user. Car stereo 470 also includes an antenna 476 for communicating via personal network 430. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of car stereos that may be used in relation to one or more embodiments of the present invention.

[0045] Cellular telephone 450 may be any device capable of transmitting and/or receiving information via a cellular network 460 as are known in the art. As shown, cellular telephone 450 includes a graphical user interface 452, a keypad 454, and a microphone 456. In addition, cellular telephone 450 includes an antenna 458 for communicating via personal network 430. In some embodiments of the present invention, graphical user interface 452 operates as a remote user interface for UMCS 410. Some approaches for using such remote interfaces are disclosed in the patent application entitled "Systems and Methods for Mobile Data Storage and Acquisition" that was previously incorporated herein by reference for all purposes.

[0046] Personal digital assistant 440 may be any processor based portable computer that is known in the art. A shown, personal digital assistant 440 includes a graphical user interface 444, a set of IO 446, and an antenna 442 for communicating via personal network 430. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of personal digital assistants and other processor based portable computing devices that may be used in relation to a variety of embodiments of the present invention.

[0047] Turning to Fig. 5, a flow diagram 900 depicts one exemplary method for utilizing operational environment in accordance with one or more embodiments of the present invention.

Following flow diagram 900, UMCS 410 is brought in proximity to other elements of operational environment 400 (block 903). UMCS 410 identifies the other elements of operational environment 400 and communicably connects to the identified devices (block 906). This connection process may include, but is not limited to, connecting to a cellular telephone (block 912), connecting to a car stereo (block 914), connecting to a personal digital assistant (block 916), and connecting to a GPS device (block 918). Once communicably connected, one or more operational sequences may be processed. In some cases, the processing is done without the intervention of hands, but may be controlled by, for example, audible commands. It should be noted that while four hands free operational scenarios are discussed below in relation to Fig. 5, based on the disclosure provided herein, one of ordinary skill in the art will recognize a myriad of other operational scenarios that may be implemented in accordance with various embodiments of the present invention.

[0048] In one operational sequence, cellular telephone 450 receives an incoming telephone call and provides an indication of the incoming telephone call (block 909). Indicating the incoming call may be done in a number of ways. For example, the call may be indicated by a standard audible ringer on cellular telephone 450, or cellular telephone 450 may communicate the incoming call to another device in operational environment 400 via personal network 430. Thus, for example, cellular telephone 450 may communicate the incoming call status to car stereo 470, and in turn car stereo 470 may audibly play an incoming call signal to alert a user, and/or display an incoming call signal to the user. This may include displaying or audibly identifying caller ID or other information about the incoming call. It may be advantageous to use car stereo 470 to handle the incoming call indication as it may be desirable to handle all audio outputs playing in operational environment 400 at one central audio output device. Where, for example, car stereo 470 is playing music, the volume of the music may be lowered or altogether muted while the call is handled. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a myriad of approaches that may be used to indicate an incoming call within operational environment 400 in accordance with one or more embodiments of the present invention.

[0049] A user may then audibly command pickup of the call (block 915). This audible command may be fielded by a device in operational environment 400. For example, cellular

telephone 450 may have a microphone and audible command software that it may use to parse an incoming audible command. Alternatively, personal digital assistant 440 may include a microphone and audible command software that it may use to parse an incoming audible command. In any event, once the audible command is received and parsed (block 915), the command is transferred to cellular telephone 450 (block 921). In response, cellular telephone 450 causes the incoming call to be connected, and the audio from the incoming call is provided to UMCS 410 where it is then routed to a selected audio output device (block 924). In one particular embodiment of the present invention, the selected audio output device is car stereo 470. In this case, the audio portion of the phone call is played via car stereo 470. In a situation where car stereo 470 was playing music or another audio output prior to receiving the phone call, the volume of the previously played audio is reduced (or altogether muted) while the phone call is handled (block 927). Once the phone call is completed, the volume of the previously playing audio is returned to what it was before the telephone call was received (block 948).

[0050] In another operational sequence, a user audibly commands the initiation of a telephone call (block 933). The audible command may be received and implemented by one of the devices in operational environment 400. For example, cellular telephone 450 may include an audible dialer function that may be used to initiate the telephone call. Alternatively, personal digital assistant 440 may include a microphone and audible command software that it may use to parse an incoming audible command. In such a case, personal digital assistant may include an electronic phone book that cross references various names and numbers in the electronic phone book with corresponding audible sounds. In any event, once the audible command is received and parsed (block 933), the dialing details (e.g., telephone number) for the call are transferred to cellular telephone 450 (block 936) that in turn initiates the call using the dialing details (block 939). Once the call is initiated (block 939), an audio portion of the telephone call is provided to UMCS 410 where it is then routed to a selected audio output device (block 942). In one particular embodiment of the present invention, the selected audio output device is car stereo 470. In this case, the audio portion of the phone call is played via car stereo 470. In a situation where car stereo 470 was playing music or another audio output prior to receiving the phone call, the volume of the previously played audio is reduced (or altogether muted) while the phone call is handled (block 945). Once the phone call is completed, the volume of the previously playing audio is returned to what it was before the telephone call was received (block 948).

[0051] In yet another operational sequence, a user audibly commands a certain play list or audio selection to be played on car stereo 470 (block 951). The audible command may be received and implemented by one of the devices in operational environment 400. For example, personal digital assistant 440 may include a microphone and audible command software that it may use to parse an incoming audible command. In such a case, personal digital assistant may include an audible selection tool that is capable of receiving an audible command and converting the audible command into a file selection (e.g., a play list command). In any event, once the audible command is received and parsed (block 951), the audio file command (e.g., a play list) is transferred to UMCS 410 (block 954). In turn, UMCS 410 uploads the requested file(s) from Non-volatile memory 428 to car stereo 470 (block 957), and car stereo 470 plays the audio selections (block 960).

[0052] In yet a further operational sequence, driving directions (e.g., a destination address) is uploaded from personal digital assistant 440 to location device 480 via personal network 430 (block 963). These driving directions may be programmed by a user into personal digital assistant 440 before beginning a journey, may be downloaded to personal digital assistant 440 from a host computer prior to a journey, or may be downloaded to personal digital assistant via the Internet that is accessed through cellular telephone 450. Based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of mechanisms for getting destination information to personal digital assistant 440. Based on the driving directions and the location function supported by location device 480, location device 480 may generate audible direction information (i.e., an audio command set) that tells the user where to turn and how to get to the particular destination. This audible direction information is routed to car stereo 470 via UMCS 410 (block 966). In turn, car stereo 470 plays the audible driving directions (block 969).

[0053] Figs. 6-9 show other exemplary operational environments 500, 600, 700, 800 in accordance with other embodiments of the present invention. While five different operational environments are specifically discussed herein, it should be noted that based on the disclosure provided herein, one of ordinary skill in the art will recognize a variety of other operational environments that may be used in relation to various embodiments of the present invention. Turning to Fig. 6, an operational environment 500 that is substantially the same as operational environment 400 is shown. The difference is that operational environment 500 does not include

a location device. In such cases, the functions of location device 480 as discussed above in relation to Fig. 5 may not be available or may be performed by personal digital assistant 440 or cellular telephone 450 where those devices include integrated location functionality. Turning to Fig. 7, an operational environment 600 that is substantially the same as operational environment 500 is shown. The difference is that operational environment 600 does not include a car stereo. In such cases, the functions of car stereo 470 as discussed above in relation to Fig. 5 may be performed by an audio output that is integrated as part of cellular telephone 450 or personal digital assistant 440.

[0054] Turning to Fig. 8, an operational environment 700 in accordance with one or more embodiments of the present invention is depicted. Operational environment 700 includes UMCS 410, cellular telephone 450, and a headset 490 that are all communicably coupled via personal network 430. Headset 490 includes a microphone 492, an audio output device 494 and an antenna 496 for communicating with personal network 430. Operational environment 700 is capable of performing the operational sequences discussed above in relation to Fig. 5 where a location device is integrated with cellular telephone. In such a case, audible commands are received via headset 490 and transferred to cellular telephone 450 where they are parsed and executed. The audio output that is discussed in Fig. 5 as being output by car stereo 470 is instead sent to audio output device 494. Turning to Fig. 9, another operational environment 800 in accordance with yet other embodiments of the present invention is shown. Operational environment 800 is substantially the same as operational environment 700 except that personal digital assistant 440 is included. In such a case, some of the command reception and parsing discussed in relation to operational environment 700 may be performed by personal digital assistant 440.

[0055] In conclusion, the present invention provides novel systems, devices, methods and arrangements for implementing hands free operational environments. It should be noted that while a number of different operational environments and methods for using such have been discussed herein, that one of ordinary skill in the art upon reading this disclosure would appreciate other operational environments and methods for using such that may be implemented. In particular, while detailed descriptions of one or more embodiments of the invention have been given above, various alternatives, modifications, and equivalents will be apparent to those skilled

in the art without varying from the spirit of the invention. Therefore, the above description should not be taken as limiting the scope of the invention, which is defined by the appended claims.

WHAT IS CLAIMED IS:

1. A hands free operational environment, the hands free operational environment comprising:

a routing device;

an audio transmission device;

an audio output device;

an audio input device, wherein the audio input device is operable to receive an audible command, and wherein the audible command is operable to cause an operation on at least one of the routing device, the audio output device, and the audio transmission device; and

wherein the routing device communicably couples the audio transmission device to one or more of the audio input device and the audio output device.

2. The hands free operational environment of claim 1, wherein the routing device is integrated with a mobile storage device, and wherein the mobile storage device includes:

a processor; and

a memory, wherein the memory includes a non-volatile memory component.

3. The hands free operational environment of claim 2, wherein the audible command is a request to play an audio file on the audio output device, and wherein the memory includes instructions executable by the processor to:

store the audio file in the non-volatile storage medium;

receive a request to provide the audio file to the audio output device via a wireless communication network;

access the audio file from the non-volatile storage medium; and

provide the audio file to the audio output device via the wireless communication network.

4. The hands free operational environment of claim 3, wherein the wireless communication network is a Bluetooth network.

5. The hands free operational environment of claim 1, wherein the audio transmission device is a cellular telephone, wherein the audio output device is a car stereo, and wherein the audible command is a command to initiate a call.

6. The hands free operational environment of claim 5, wherein the audio input device is integrated into a personal digital assistant, and wherein upon receiving the audible input command the personal digital assistant transfers call information to the cellular telephone, and wherein upon receiving the call information the cellular telephone initiates a call using the call information.

7. The hands free operational environment of claim 6, wherein an audio portion of the call is routed from the cellular telephone to the car stereo via the routing device.

8. The hands free operational environment of claim 7, wherein the volume of a previously playing audio file is reduced, and wherein the audio portion of the call is played on the car stereo at a volume greater than that of the previously playing audio file.

9. The hands free operational environment of claim 1, wherein the audio transmission device is a cellular telephone, wherein the audio output device is a car stereo, and wherein the audible command is a command to receive a call.

10. The hands free operational environment of claim 9, wherein an audio portion of the call is routed from the cellular telephone to the car stereo via the routing device.

11. The hands free operational environment of claim 10, wherein the volume of a previously playing audio file is reduced, and wherein the audio portion of the call is played on the car stereo at a volume greater than that of the previously playing audio file.

12. The hands free operational environment of claim 1, wherein the hands free operational environment further includes a location device.

13. The hands free operational environment of claim 12, wherein an audio command set is provided from the location device to the audio output device via the routing device, and wherein the audio output device plays the audio command set.

14. A method for hands free operation, the method comprising:

providing a routing device;

communicably coupling the routing device via a wireless network to:

an audio output device,

an audio input device, and

an audio transmission device; and

receiving an audible command via the audio input device, wherein the audible command is operable to cause an operation on at least one of the routing device, the audio output device, and the audio transmission device.

15. The method of claim 14, wherein the routing device is incorporated in a mobile storage device, wherein the mobile storage device includes a non-volatile storage component, wherein the audible command is a request to play an audio file, and wherein the method further comprises:

storing the audio file in the non-volatile storage medium;

accessing the audio file from the non-volatile storage medium; and

providing the audio file to the audio output device via the wireless communication network.

16. The method of claim 14, wherein the wireless communication network is a Bluetooth network.

17. The method of claim 14, wherein the audio transmission device is a cellular telephone, wherein the audio output device is a car stereo, and wherein the audible command is a command to receive a call.

18. The method of claim 17, wherein the method further comprises:

routing an audio portion of the call from the cellular telephone to the car stereo via the routing device.

19. The method of claim 18, wherein the method further comprises:

reducing the volume of an audio file previously playing on the car stereo; and

playing the audio portion of the call at a volume greater than that of the previously playing audio file.

20. The method of claim 14, wherein the audio transmission device is a cellular telephone, wherein the audio output device is a car stereo, wherein the audio input device is integrated into a personal digital assistant, and wherein the audible command is a command to initiate a call.

21. The method of claim 20, wherein the method further comprises:

upon receiving the audible input command, the personal digital assistant transfers call information to the cellular telephone;

upon receiving the call information the cellular telephone initiates a call using the call information; and

routing an audio portion of the call from the cellular telephone to the car stereo via the routing device.

22. The method of claim 21, wherein the audio portion of the call is overlaid on a previously playing audio file on the car stereo.

23. The method of claim 14, wherein the method further comprises:

communicably coupling the routing device via the wireless network to a location device.

24. The method of claim 23, wherein the method further comprises:

receiving an audio command set from the location device at the audio output device; and

playing the audio command set on the audio output device.

25. A system for implementing a hands free automobile environment, the system comprising:

a mobile storage device, wherein the mobile storage device includes a routing function, and wherein the mobile storage device includes a memory with a non-volatile memory component and a processor, and wherein the memory includes instructions executable by the processor to:

communicably couple the mobile storage device to a cellular telephone, a car stereo, and an audio input device via a Bluetooth network; and

route audio information from the mobile storage device to the car stereo based at least in part on the received audible command.

26. The system of claim 25, wherein the received audible command is a request to play an audio file, and wherein the memory further includes instructions executable by the processor to:

store the audio file in the non-volatile storage medium;

access the audio file from the non-volatile storage medium; and

provide the audio file to the audio output device via the wireless communication network.

27. The system of claim 25, wherein the received audible command is a request to receive a call, and wherein the memory further includes instructions executable by the processor to:

transfer a derivative of the received audible command to the cellular telephone;

receive an audio portion of the call from the cellular telephone; and

route the audio portion of the cellular telephone to the car stereo via the Bluetooth network.

28. The system of claim 25, wherein the received audible command is a request to initiate a call, and wherein the memory further includes instructions executable by the processor to:

transfer a derivative of the received audible command to the cellular telephone;

receive an audio portion of the call from the cellular telephone; and

route the audio portion of the cellular telephone to the car stereo via the Bluetooth network.

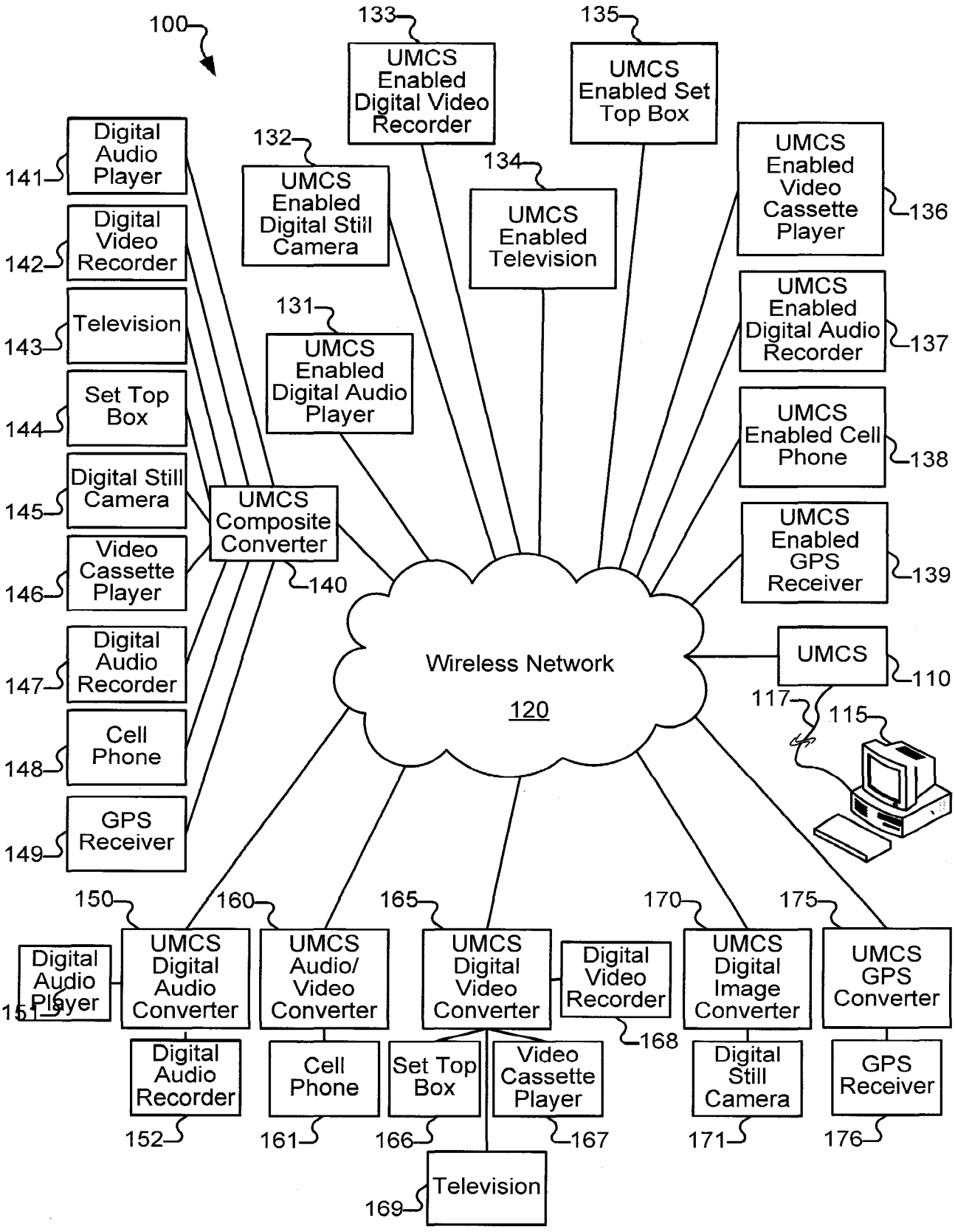

100
133
UMCS Enabled Digital Video Recorder
135
UMCS Enabled Set Top Box
132
UMCS Enabled Digital Still Camera
134
UMCS Enabled Television
UMCS Enabled Video Cassette Player
136
131
UMCS Enabled Digital Audio Player
UMCS Enabled Digital Audio Recorder
137
UMCS Enabled Cell Phone
138
UMCS Enabled GPS Receiver
139
141 Digital Audio Player
142 Digital Video Recorder
143 Television
144 Set Top Box
145 Digital Still Camera
146 Video Cassette Player
147 Digital Audio Recorder
148 Cell Phone
149 GPS Receiver
UMCS Composite Converter
140
Wireless Network
120
UMCS
110
117
115
150
160
165
170
175
151 Digital Audio Player
UMCS Digital Audio Converter
UMCS Audio/ Video Converter
UMCS Digital Video Converter
Digital Video Recorder
168
UMCS Digital Image Converter
UMCS GPS Converter
Digital Audio Recorder
152
Cell Phone
161
Set Top Box
166
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Digital Still Camera
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GPS Receiver
176
Television
169

Figure 1

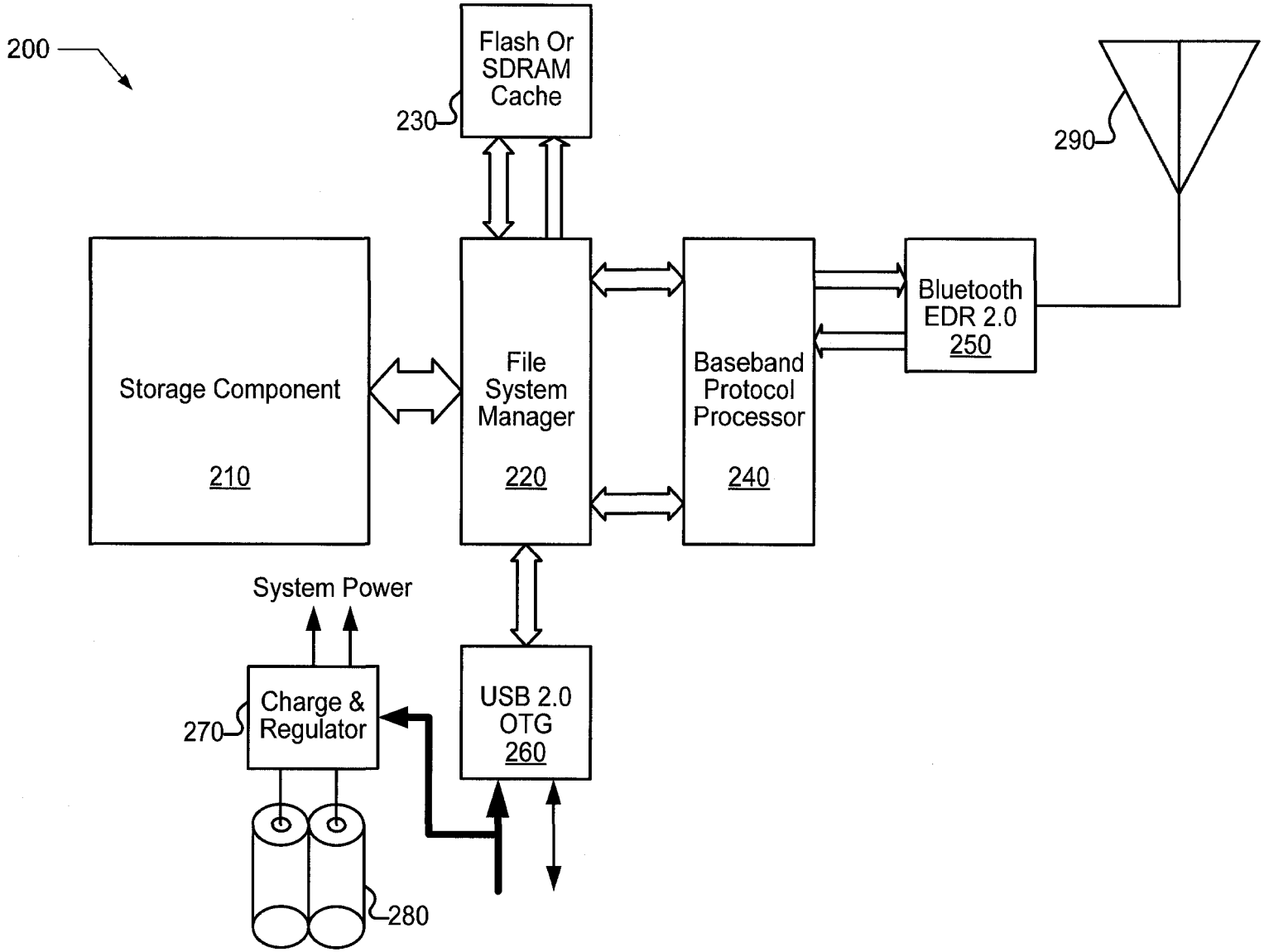

200
Flash Or SDRAM Cache
230
290
Storage Component
210
File System Manager
220
Baseband Protocol Processor
240
Bluetooth EDR 2.0
250
System Power
Charge & Regulator
270
USB 2.0 OTG
260
280

Figure 2

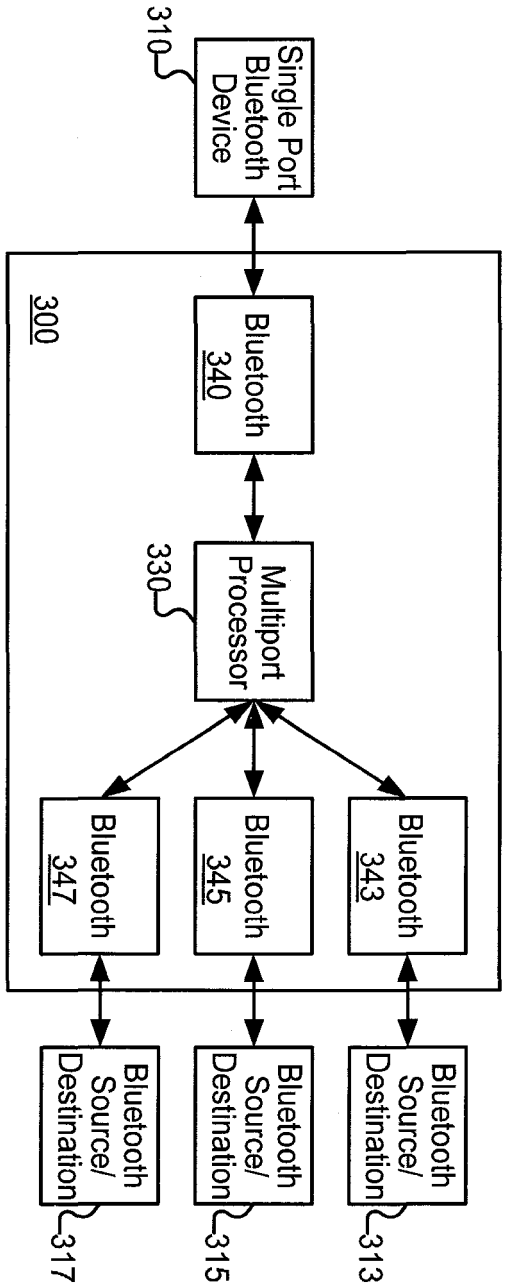

310
Single Port Bluetooth Device
300
Bluetooth 340
330
Multiport Processor
Bluetooth 347
Bluetooth 345
Bluetooth 343
Bluetooth Source/ Destination
317
Bluetooth Source/ Destination
315
Bluetooth Source/ Destination
313

Figure 3

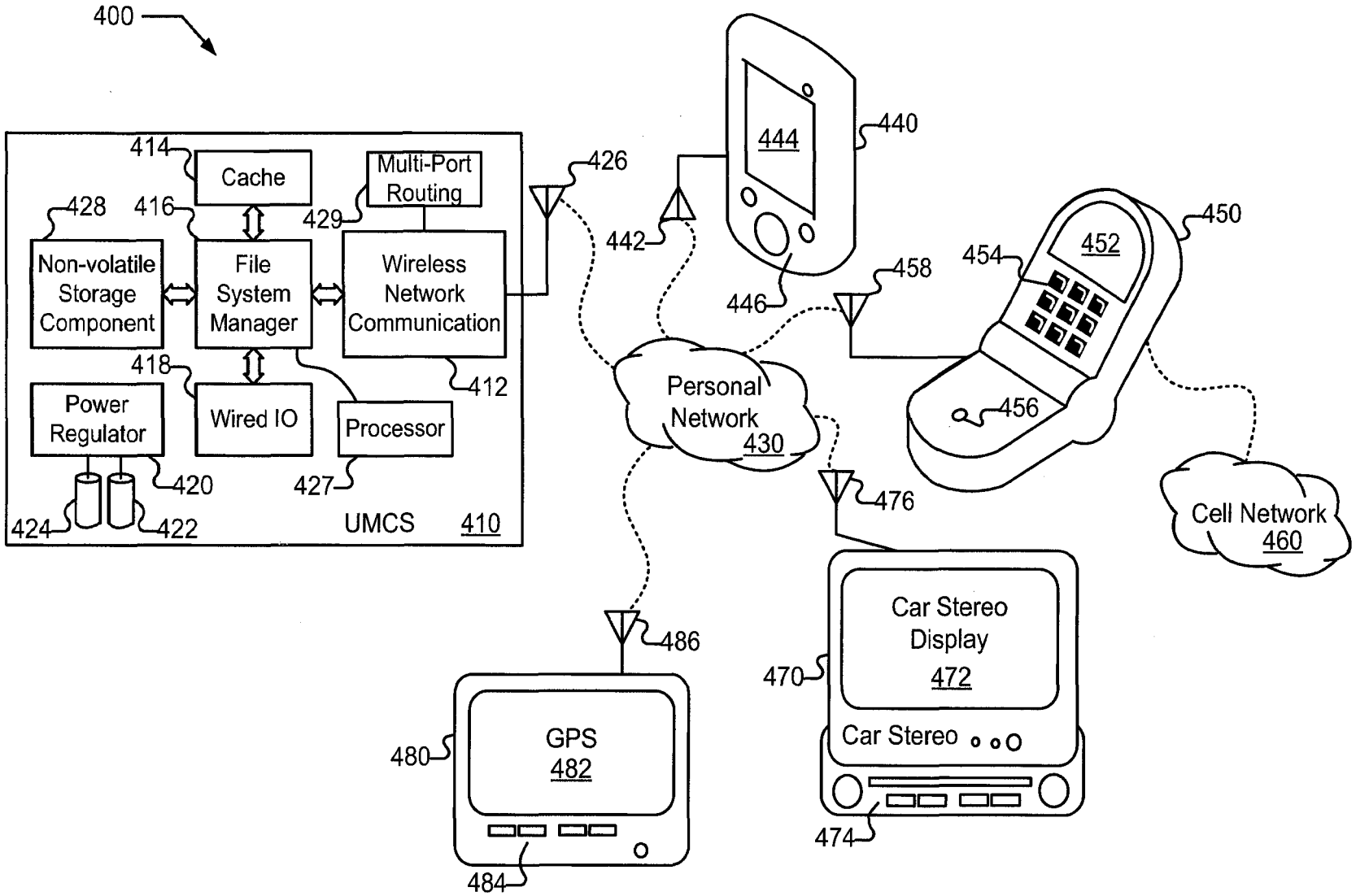

400
414
Cache
Multi-Port Routing
428
416
429
Non-volatile Storage Component
File System Manager
Wireless Network Communication
426
418
412
Power Regulator
Wired IO
Processor
420
427
424
422
UMCS 410
444
440
442
446
458
452
450
454
456
Personal Network 430
476
Cell Network 460
486
Car Stereo Display 472
470
GPS 482
480
Car Stereo
474
484

Figure 4

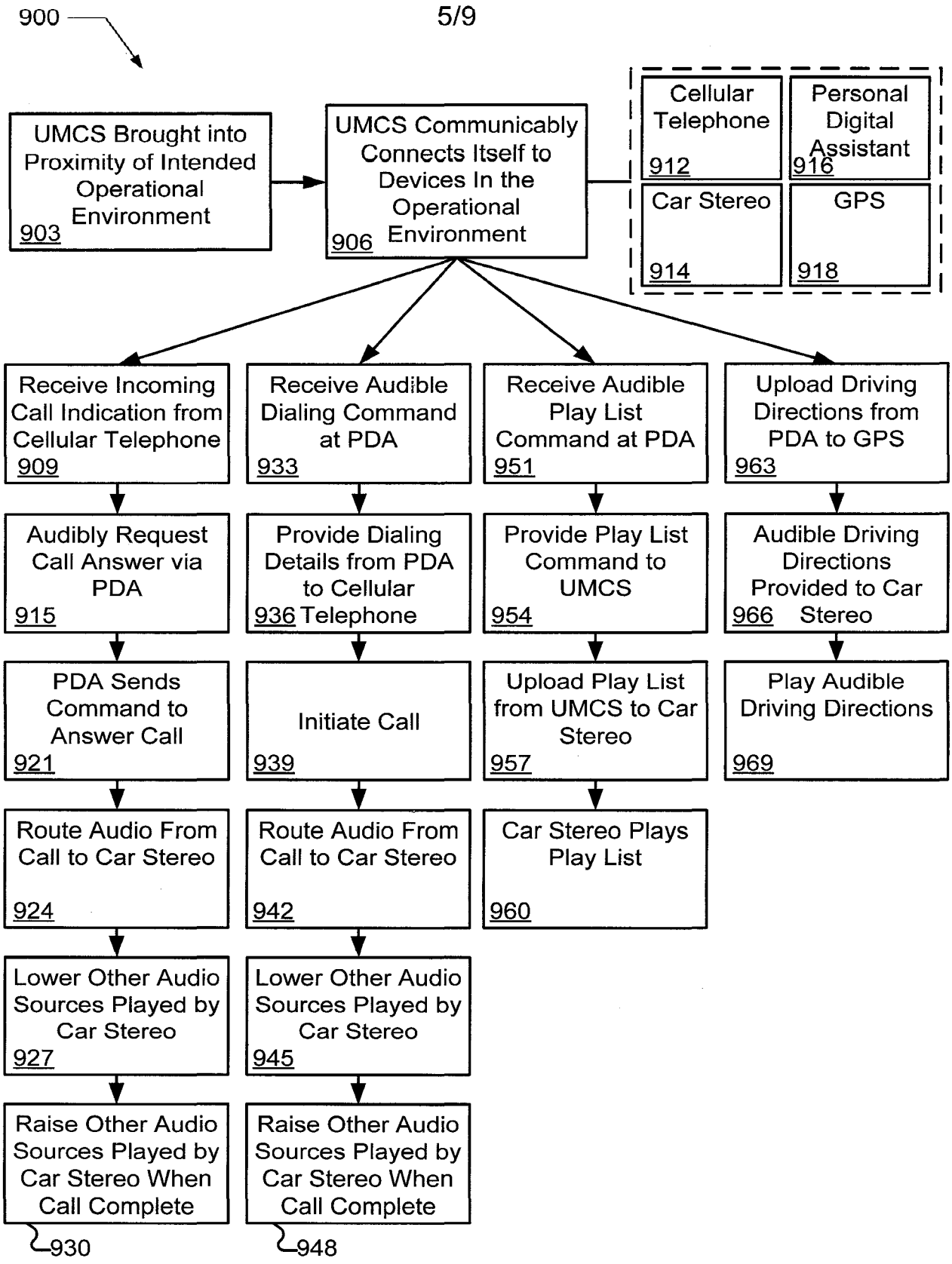

900
UMCS Brought into Proximity of Intended Operational Environment 903
UMCS Communicably Connects Itself to Devices In the Operational Environment 906
Cellular Telephone 912
Personal Digital Assistant 916
Car Stereo 914
GPS 918
Receive Incoming Call Indication from Cellular Telephone 909
Receive Audible Dialing Command at PDA 933
Receive Audible Play List Command at PDA 951
Upload Driving Directions from PDA to GPS 963
Audibly Request Call Answer via PDA 915
Provide Dialing Details from PDA to Cellular 936 Telephone
Provide Play List Command to UMCS 954
Audible Driving Directions Provided to Car 966 Stereo
PDA Sends Command to Answer Call 921
Initiate Call 939
Upload Play List from UMCS to Car Stereo 957
Play Audible Driving Directions 969
Route Audio From Call to Car Stereo 924
Route Audio From Call to Car Stereo 942
Car Stereo Plays Play List 960
Lower Other Audio Sources Played by Car Stereo 927
Lower Other Audio Sources Played by Car Stereo 945
Raise Other Audio Sources Played by Car Stereo When Call Complete
930
Raise Other Audio Sources Played by Car Stereo When Call Complete
948

Figure 5

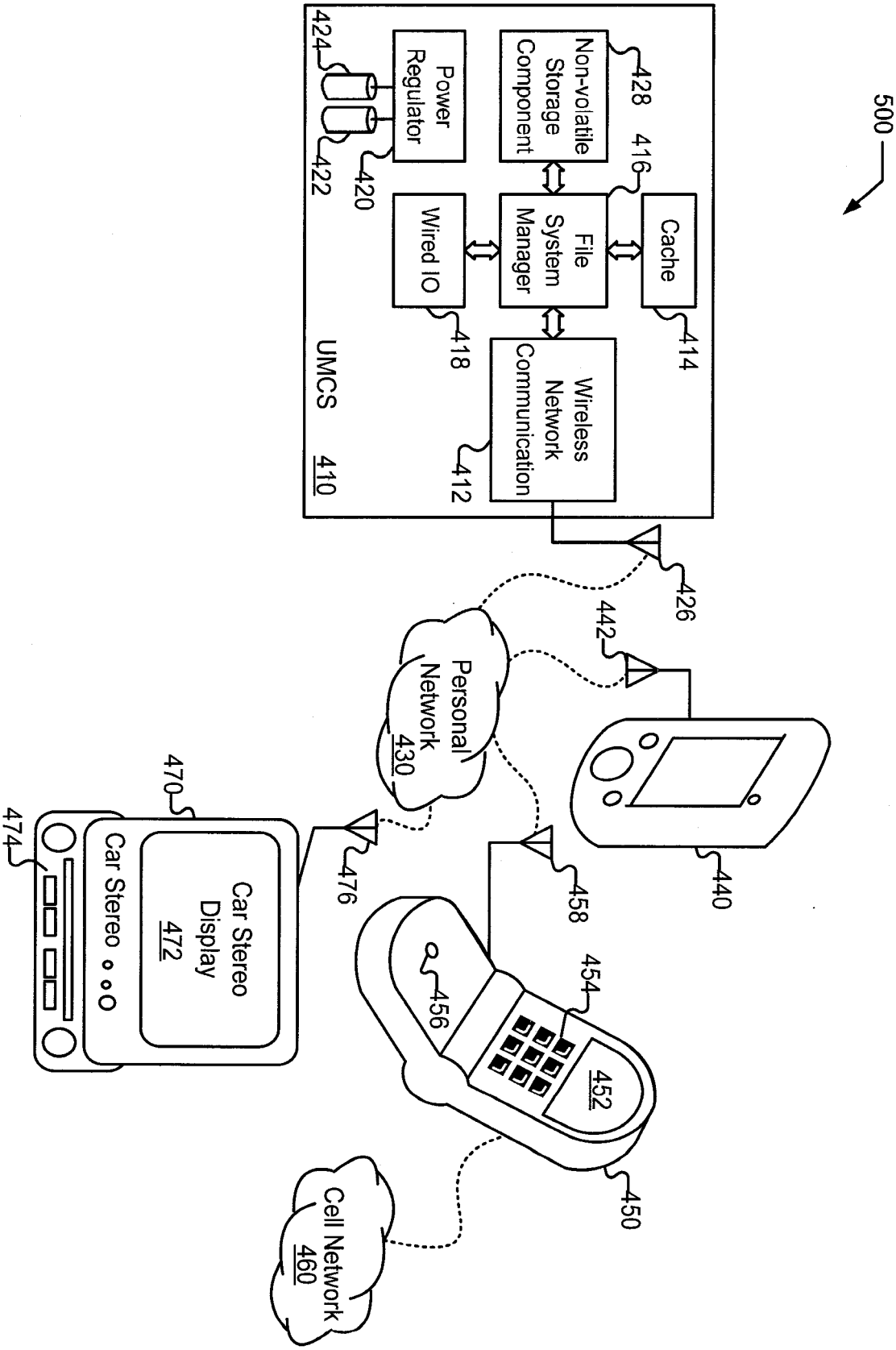

500
UMCS 410
Non-volatile Storage Component
428
416
Cache
414
File System Manager
Power Regulator
424
422
420
Wired IO
418
Wireless Network Communication
412
426
442
Personal Network 430
440
458
454
456
452
450
476
Car Stereo Display 472
470
Car Stereo
474
Cell Network 460

Figure 6

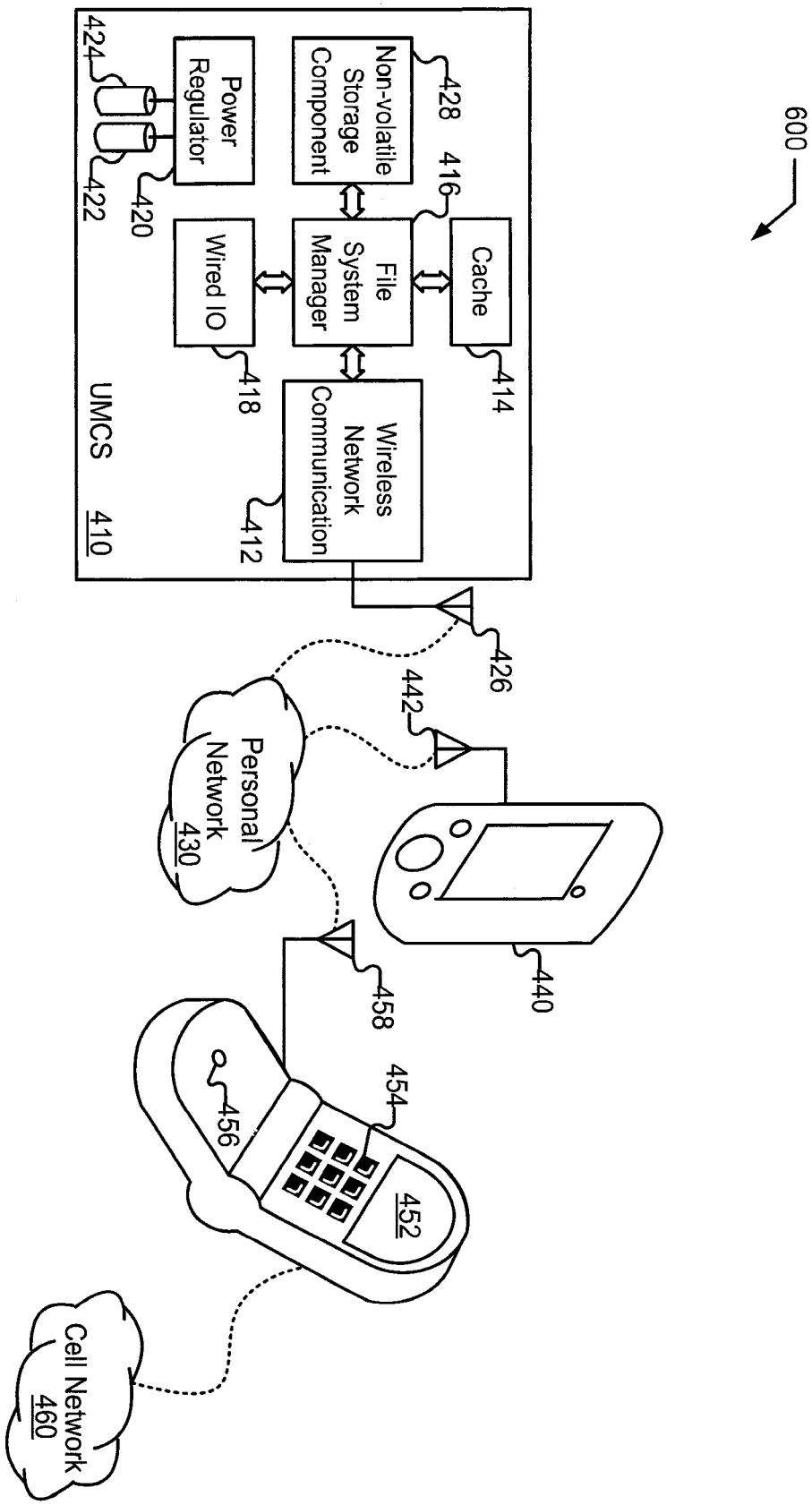

600
UMCS 410
Non-volatile Storage Component
428
416
Cache
414
File System Manager
Power Regulator
424
422
420
Wired IO
418
Wireless Network Communication
412
426
442
Personal Network 430
440
458
454
456
452
Cell Network 460

Figure 7

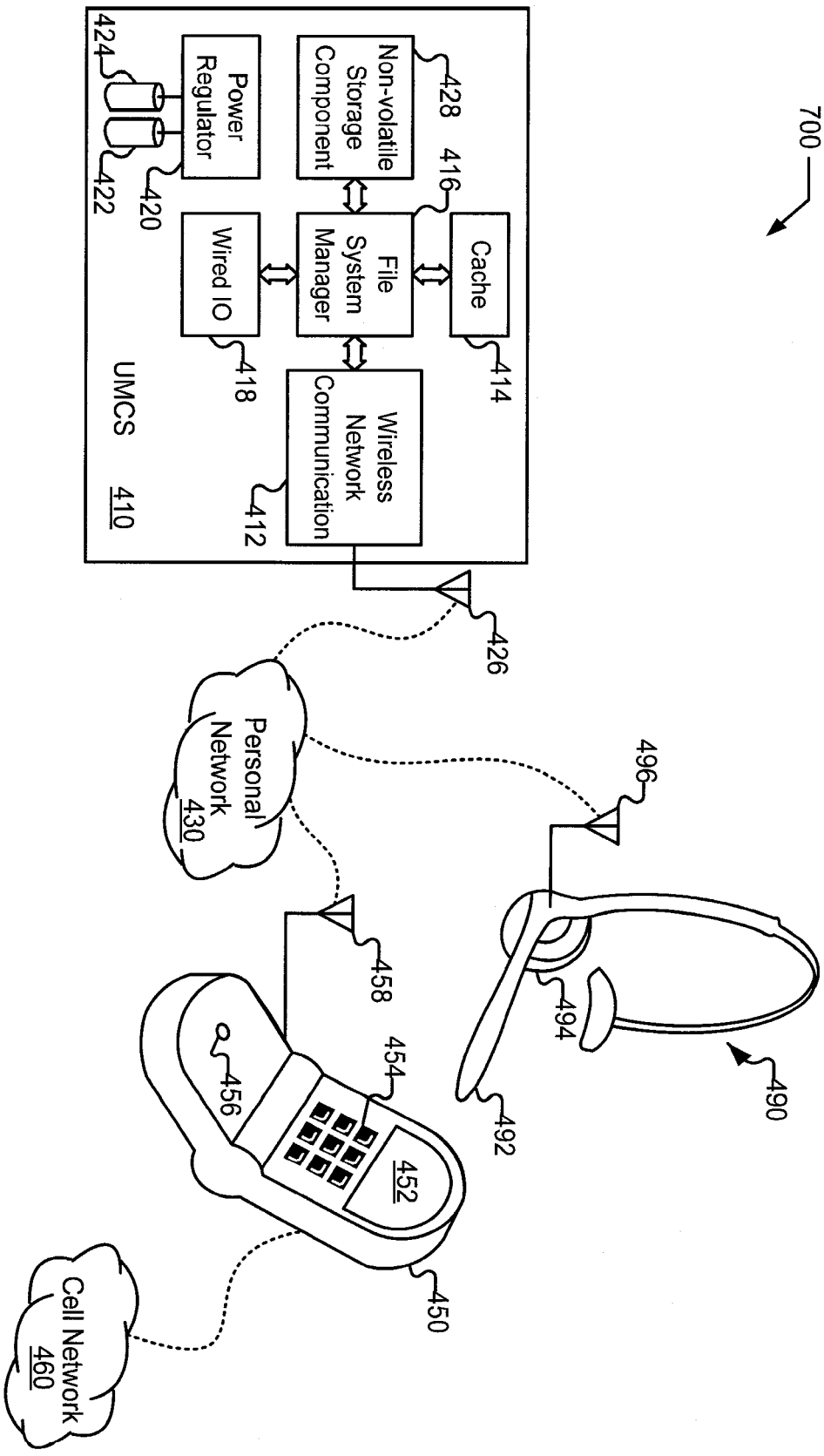

700
UMCS 410
Non-volatile Storage Component
428
416
Power Regulator
424
422
420
Wired IO
418
File System Manager
Cache
414
Wireless Network Communication
412
426
Personal Network 430
496
494
490
492
458
454
456
452
450
Cell Network 460

Figure 8

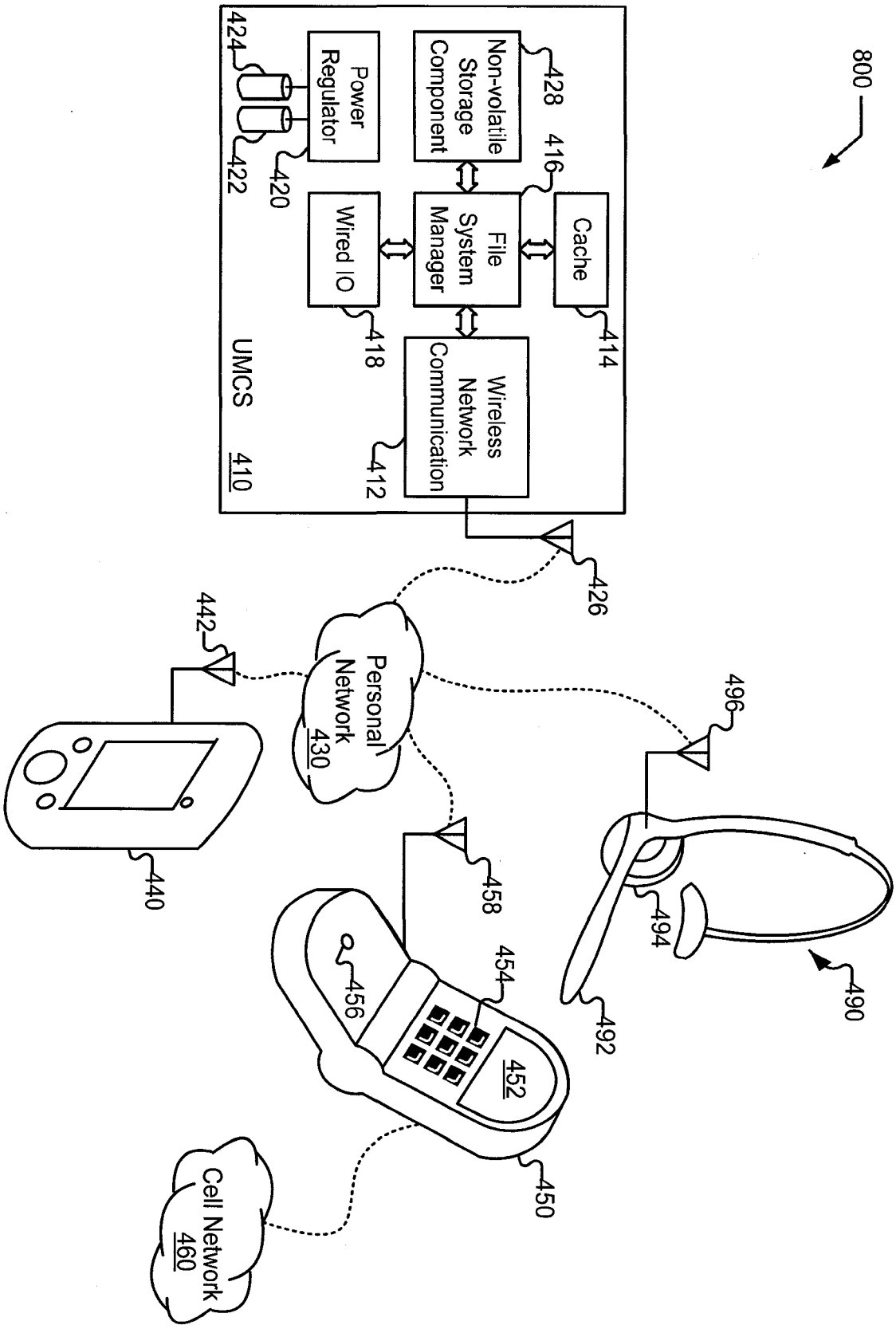

800
UMCS 410
Non-volatile Storage Component
428
416
File System Manager
Cache
414
Power Regulator
424
422
420
Wired IO
418
Wireless Network Communication
412
426
Personal Network 430
442
440
496
494
490
492
458
454
452
456
450
Cell Network 460

Figure 9