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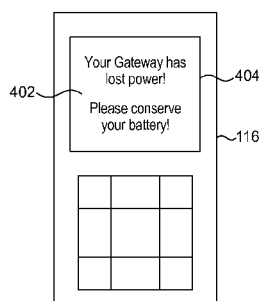
(54) **Title:** RESIDENTIAL GATEWAY WHICH ALERTS USER WHEN SWITCHING FROM MAINS TO BATTERY POWER

FIG. 4A

(57) **Abstract:** The application relates to home network devices such as a telephone and cable service provider gateway which is connected to an in-home network and an external network, such as the Internet. Typically, these gateways, in particular when they include VoIP services, include a battery backup such when the gateway loses power all services except the VoIP service are switched off. This is done to preserve the battery charge and to keep the time to make emergency calls as long as possible. However, these gateways do neither alert the consumer that the gateway is on battery power nor provide an indication how much battery power is remaining in the gateway. This problem is solved by the present invention in that the gateway sends a message to either a device connected to it, such as a wireless phone, e.g. a DECT handset, or to a device connected to the external network, e.g. a cellular phone. The message can either be a voice message or a text message.

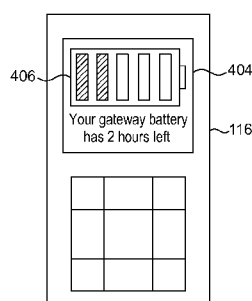


FIG. 4B

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RESIDENTIAL GATEWAY WHICH ALERTS USER WHEN SWITCHING FROM MAINS
TO BATTERY POWER

CROSS-REFERENCE TO RELATED APPLICATION

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This application claims the benefit of U.S. Provisional Application Serial No. 62/000,193, filed on May 19, 2014, which is incorporated by reference herein in its entirety.

10

TECHNICAL FIELD

The present disclosure generally relates to home networking systems, and more particularly, to a method and apparatus for alerting a user of operational status in a device (e.g., upon loss in power of the device).

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BACKGROUND

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Today, modems, such as cable modems, offer Internet connectivity to subscribers' homes. These modems are typically connected to an information distribution network, such as a coaxial cable network, an optical fiber network, a hybrid fiber/coaxial cable network, or a wireless network, and communicate with a network device outside the home (e.g., a termination system, such as a cable modem termination server, or CMTS). Within the home, the modem may be connected to an in-home network, such as an Ethernet network, an in-home coaxial cable network (e.g., per the Multimedia Over Coax Alliance (MoCA) specification), wireless network, etc., and various devices within the home may use that network to ultimately communicate with network devices outside the home. Additionally, the modem may provide telephone services to the home (e.g., Voice over IP (VoIP) services). Such multi-function modems are commonly referred to as a gateway or gateway device.

In the United States, it is required by many operators to provide phone services when the home loses power so consumers can still make emergency phone calls (i.e., a phone call to 911). As such, many telephone and cable service provider gateways which include VoIP services include a battery backup. When the gateway

loses power, the gateway seamlessly switches to the battery power. Typically, the gateway will switch off all services (e.g. Ethernet, Wi-Fi, data services, etc.) except the voice service. The gateway does this in order to preserve the battery charge and keep the time to make emergency calls as long as possible. However, conventional
5 gateways do not alert the consumer that the gateway is on battery power nor provide an indication how much battery power is remaining for the gateway. Such information would be valuable so the consumer can conserve the battery power to make emergency telephone call if the need arises.

10 Therefore, a need exists for techniques for alerting a consumer when the gateway is on battery power so they can conserve power or resolve the power issue (e.g. circuit breaker, power cord disconnected, etc.).

15 **SUMMARY**

According to one aspect of the present disclosure, a method is provided including, inter alia, determining an operational status for a home network device, the operational status including a first operational status indicating that the home network
20 device is not using a battery for a power source and a second operational status indicating that the home network device is using the battery for the power source, and sending a message to a device connected to the home network device in order to alert a user to a change in the operational status for the home network device if it is determined that the operational status for the home network device has changed
25 from the first operational status to the second operational status.

According to another aspect of the present disclosure, a gateway apparatus for providing services to a home network includes, inter alia, a battery management module that determines an operational status for the apparatus, the operational
30 status including a first operational status indicating that the apparatus is not using a battery for a power source and a second operational status indicating that apparatus is using the battery for the power source, and a controller coupled to the battery management module, the controller sending a message to a device connected to the apparatus in order to alert a user to a change in the operational status for the

apparatus if it is determined that the operational status for the apparatus has changed from the first operational status to the second operational status.

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BRIEF DESCRIPTION OF THE DRAWINGS

These, and other aspects, features and advantages of the present disclosure will be described or become apparent from the following description of the embodiments, which is to be read in connection with the accompanying drawings.

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In the drawings, wherein like reference numerals denote similar elements throughout the views:

FIG. 1 is a block diagram of an exemplary information distribution network for delivering services to a residence in accordance with the present disclosure;

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FIG. 2 is a block diagram of an exemplary gateway device in accordance with the present disclosure;

FIG. 3 is a flowchart of an exemplary method for alerting a user of an operational status change in a gateway device in accordance with an embodiment of the present disclosure;

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FIG. 4A illustrates a message alert send to a device as a text message in accordance with an embodiment of the present disclosure;

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FIG. 4B illustrates a message alert send to a device as a graphic in accordance with an embodiment of the present disclosure; and

FIG. 5 is a block diagram of another exemplary information distribution network for delivering services in accordance with the present disclosure.

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It should be understood that the drawing(s) is for purposes of illustrating the concepts of the disclosure and is not necessarily the only possible configuration for illustrating the disclosure.

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DESCRIPTION OF EMBODIMENTS

It should be understood that the elements shown in the figures may be implemented in various forms of hardware, software or combinations thereof. Preferably, these elements are implemented in a combination of hardware and software on one or more appropriately programmed general-purpose devices, which may include a processor, memory and input/output interfaces. Herein, the phrase "coupled" is defined to mean directly connected to or indirectly connected with through one or more intermediate components. Such intermediate components may include both hardware and software based components.

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The present description illustrates the principles of the present disclosure. It will thus be appreciated that those skilled in the art will be able to devise various arrangements that, although not explicitly described or shown herein, embody the principles of the disclosure and are included within its scope.

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All examples and conditional language recited herein are intended for pedagogical purposes to aid the reader in understanding the principles of the disclosure and the concepts contributed by the inventor to furthering the art, and are to be construed as being without limitation to such specifically recited examples and conditions.

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Moreover, all statements herein reciting principles, aspects, and embodiments of the disclosure, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. Additionally, it is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future, i.e., any elements developed that perform the same function, regardless of structure.

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Thus, for example, it will be appreciated by those skilled in the art that the block diagrams presented herein represent conceptual views of illustrative system components and/or circuitry embodying the principles of the disclosure. Similarly, it will be appreciated that any flow charts, flow diagrams, state transition diagrams, pseudocode, and the like represent various processes which may be substantially represented in computer readable media and so executed by a computer or processor, whether or not such computer or processor is explicitly shown.

The functions of the various elements shown in the figures may be provided through the use of dedicated hardware as well as hardware capable of executing software in association with appropriate software. When provided by a processor, the functions may be provided by a single dedicated processor, by a single shared processor, or by a plurality of individual processors, some of which may be shared. Moreover, explicit use of the term "processor", "module" or "controller" should not be construed to refer exclusively to hardware capable of executing software, and may implicitly include, without limitation, digital signal processor ("DSP") hardware, read only memory ("ROM") for storing software, random access memory ("RAM"), and nonvolatile storage.

Other hardware, conventional and/or custom, may also be included. Similarly, any switches shown in the figures are conceptual only. Their function may be carried out through the operation of program logic, through dedicated logic, through the interaction of program control and dedicated logic, or even manually, the particular technique being selectable by the implementer as more specifically understood from the context.

In the claims hereof, any element expressed as a means for performing a specified function is intended to encompass any way of performing that function including, for example, a) a combination of circuit elements that performs that function or b) software in any form, including, therefore, firmware, microcode or the like, combined with appropriate circuitry for executing that software to perform the function. The disclosure as defined by such claims resides in the fact that the functionalities provided by the various recited means are combined and brought

together in the manner which the claims call for. It is thus regarded that any means that can provide those functionalities are equivalent to those shown herein.

When a consumer loses power (e.g. power loss to home, power plug
5 accidentally disconnected, etc.) to a gateway device on a home network, the gateway switches to battery power. It is critical to conserve battery power so certain services provided by the gateway remain operational for the longest possible time period if necessary (e.g., the ability to make an emergency telephone call). The present disclosure provides a mechanism to alert the consumer that the gateway is on battery
10 power and what the remaining charge on the battery may be. The system and method of the present disclosure provides audio/visual alerts to the home consumer regarding the gateway (e.g. DSL, cable, LTE, etc.) via an analog or Digital Enhanced Cordless Telephone (DECT) handset. The primary alert is for battery (i.e., when the gateway is on battery power and battery charge) but the system and method of the
15 present disclosure can also include other alerts such as the gateway not being connected to the network. The alerts can be sent to the handset (e.g., analog or DECT) connected to the gateway: tones, voice messages, text messages, or graphics. An example is a voice message being mixed with an on-going call saying "you are on battery" or "your battery is old and should be replaced". Further, while
20 the embodiments of the present disclosure describe operations using a gateway device, the mechanism described may be equally applied by one skilled in the art to other electronic devices that may use remote network connected devices including, but not limited to computers, head-end devices, and home radio transceiver systems.

Turning to FIG. 1, an example information distribution network 100 is
25 illustrated. Network 100 may be any type of information distribution network, such as satellite, telephone, cellular, wireless network, etc. The example illustrated may be a hybrid fiber/coax distribution network found in many cable television networks. Such networks 100 use a series of interconnected transmission lines 102, such as coaxial
30 cables fiber optic cables, or any other desired transmission medium, to connect multiple homes 104 to a central office or headend 106. The headend 106 may transmit downstream information signals onto the lines 102, and each home 104 may have a tuner used to receive and process those signals.

The headend 106 may include a server configured to handle communications with the homes 102 using whichever communication medium is available. For example, in a coaxial cable or hybrid fiber/coax system, the headend 106 may include a modem termination system (MTS), such as a cable modem termination system (CMTS), which may be a computing device configured to manage communications between devices on the network of lines 102 and backend devices such as content sources (e.g., video on demand servers, television program sources, etc.), headend computers and other networks. The CMTS may be as specified in the Data Over Cable Service Interface Specification (DOCSIS) standard, published by Cable Television Laboratories, Inc. (a.k.a. CableLabs), or it may be a similar or modified device instead. The CMTS may be configured to place data on one or more downstream frequencies to be received by modems or gateways at the various homes 102, and to receive upstream communications from those modems or gateways on one or more upstream frequencies, as well as to serve as an interface to devices and networks that are further upstream, such as other Internet devices. Similar types of headend systems may be used for other types of networks, such as an optical fiber termination system for optical media, telephone line DSLAM (Digital Subscriber Line Access Multiplexer) for telephone lines, satellite transceiver, cellular telephone station, local area wireless (e.g., WiMax), etc.

The home 104 may be connected to the network 100 via an interface 108. The transmission line (coaxial, fiber, etc.) may be connected to a home gateway device 110. The gateway device 110 may be a computing device configured to communicate over the network 100 and with the headend 106. The gateway 110 may include, for example, a modem configured to communicate with the termination system at the headend 106.

The gateway 110 may be connected to a variety of devices within the home forming a home network 103, and may coordinate communications among those devices, and between the devices and networks outside the home 104. For example, the gateway 110 may include a modem (e.g., a DOCSIS device communicating with CMTS), and may offer Internet connectivity to one or more computers 112 within the home. The connectivity may also be extended to one or more wireless routers 114.

For example, router 114 may be an IEEE 802.11 router, local cordless telephone (e.g., Digital Enhanced Cordless Telephone--DECT), or any other desired type of wireless network. Various wireless devices within the home, such as a DECT phone 116 (or a DECT interface within a cordless telephone) and portable laptop computer 118, may communicate with the gateway 110 using wireless router 114. It is to be appreciated that the router may be integrated into the gateway 110 eliminating the need for a separate router 114.

The gateway 110 may also include one or more telephone interfaces, to allow the gateway 110 to communicate with one or more telephones 120. Telephones 120 may be a traditional analog twisted pair telephone (in which case the gateway 110 may include a twisted pair interface), or it may be a digital telephone such as a Voice Over Internet Protocol (VoIP) telephone, in which case the phone 120 may simply communicate with the gateway 110 using a digital interface, such as an Ethernet interface.

The gateway 110 may communicate with the various devices within the home using any desired connection and protocol. For example, an in-home Multimedia Over Coax Alliance (MoCA) network may use a home's internal coaxial cable network to distribute signals to the various devices in the homes. Alternatively, some or all of the connections may be of a variety of formats (e.g., MoCA, Ethernet, high definition multimedia interface (HDMI), digital visual interface (DVI), twisted pair wire, etc.), depending on the particular end device being used. The connections may also be implemented wirelessly, using local Wi-Fi, WiMax, Bluetooth, or any other desired wireless format.

The incoming line 102 may also be connected to one or more network interface devices 122, which can be set-top boxes (STBs), digital video recorders (DVRs), etc. The STBs 122 may receive and decode content via the line (e.g., optical, coaxial, etc.), and may provide that content to users for consumption, such as for viewing video content on a television 124. Alternatively, televisions, or other viewing devices 124, may be connected to transmission line 102 directly without a STB, and may perform the functions of a STB. Any type of content, such as video, video on demand, audio, Internet data etc., can be accessed in this manner. As an

alternative, the STB functionality can be incorporated with the gateway, so that the gateway 110 receives and decodes content from the line, and supplies it to the televisions for display using any desired local home physical interface.

5 Turning now to FIG.2, a block diagram of an embodiment of the gateway 110 is shown. The gateway 110 includes a triplexer 202 configured for receiving a signal transmitted over transmission line 102. The triplexer 202 provides the received signal to a low noise amplifier (LNA) 204 coupled to an RF In input of controller 206 and to an RF frontend 232. The controller 206 is interconnected via a bus to several of the
10 components of the gateway 110, including a MoCA circuit 207, Ethernet switch 208, a first WiFi module 210, a second WiFi module 212, an analog module 214, a DECT module 216, a memory or storage device 218, and a USB port 220. Additionally, the controller 206 is coupled to a battery management module 222 via the bus or other means as is known in the art. The controller 206 manages the conversion process for
15 converting the input stream signal 102 into various services, such as Internet service, telephone service, etc. The controller 206 is further coupled to control memory 218 (e.g., volatile or non-volatile memory, including random access memory, static RAM, dynamic RAM, read only memory, programmable ROM, flash memory, EPROM, EEPROM, etc.) for storing information and instruction code for controller 206.
20 Further, the implementation of the memory may include several possible embodiments, such as a single memory device or, alternatively, more than one memory circuit connected together to form a shared or common memory. Still further, the memory may be included with other circuitry, such as portions of bus communications circuitry, in a larger circuit.

25 An analog front end RF (AFE-RF) 230 interfaces to the RF frontend 232 converting the received analog signal 102 to a digital signal for the MoCA circuit 207. The MoCA circuit 207 and Ethernet switch 208 provides audio and video content to devices on the home network 103. The first WiFi module 210 (operating at 5 GHz)
30 and the second WiFi module 212 (operating at 2.4 GHz) provide wireless services to devices on the home network 103 (e.g., using Wi-Fi or the Institute for Electrical and Electronics Engineers (IEEE) 802.11 wireless protocol. It is to be appreciated that the

first and second WiFi modules may act as an access point for the home network eliminating the need for a separate device such as device 114 shown in FIG. 1.

5 The analog module 214 provides telephone service to conventional telephones via registered jack (RJ) -11 jacks disposed on a housing of the gateway 110. DECT module 216 provides telephone service to DECT compatible telephones and handsets.

10 Power is supplied to the gateway 110 via a conventional power plug and is received by AC-to-DC converter 224. The AC-to-DC converter 224 provides the converted power to the battery management module 222. The battery management module 222 includes at least one power regulator for supplying various voltage levels to the various components of the gateway 110. The battery management module 222 further provides power to and charges a battery 226, e.g., a Li-ion battery, as
15 long as uninterrupted power is being supplied to the AC-to-DC converter 224. Upon loss of power to the gateway 110, the battery management module 222 senses the power loss and transmits a signal to the controller 206. Additionally, the battery management module 222 monitors the capacity of the battery 226.

20 It is to be appreciated that at least some of the components described above in relation to FIGS. 1-2 will form an apparatus and/or system for alerting a user upon a change in operational status of a home network device (e.g., upon loss in power of a gateway device).

25 A method for alerting a user upon a change in operational status of a home network device in accordance with the present disclosure will now be described in relation to FIGS. 2 and 3. It is important to note that the method described in FIG. 3 may also be used in conjunction with the network described in FIG. 1.

30 Initially, in step 302, the gateway 200 is powered up and initialized for operation. The gateway 200 may have more than one operational status. In an embodiment, a first operational status, also referred to as a normal operational

status, uses the main power input to the gateway 200 and does not rely on, or use, a battery for power. A second operational status, referred to as a battery back up status, relies on, or uses, the battery for power. The second operation status may be used when the main power input is unavailable. The main power may be unavailable
5 because of a power outage to the home or premises (e.g., a weather related power outage).

The alternating current to direct current (AC-to-DC) converter 224 provides converted power to the battery management module 222. The battery management
10 module 222 monitors the main power input to the gateway via the AC-to-DC converter 224, step 304. In step 306, the battery management module 222 determines if there is a loss of power to the gateway 110, i.e., a change in operational status. If power is continuously being supplied, the battery management module 222 will continue to monitor the input power.

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However, if, in step 306, the battery management module 222 determines that there is a loss of power, the battery management module 222 will switch to the battery 226 to provide power to the various components of the gateway, step 308. Additionally, the battery management module 222 will send a signal to the controller
20 206, the signal indicating that there was a power loss and the gateway is now operating on battery power. In step 310, the controller 206 shuts down predetermined components to conserve power in the battery 226. In one embodiment, the controller 206 shuts down the MoCA circuit 207, the Ethernet switch 208, the first WiFi module 210 and the second WiFi module 212. The analog module 214 and DECT module
25 216 will remain powered and active to enable a user to place a telephone, e.g., in case of an emergency.

In step 312, the gateway 110 sends an alert message indicating that there is a change in the operational status of the gateway to a device on the home network,
30 e.g., to an analog phone 120 or DECT handset 116. It is to be appreciated that the controller 206 of the gateway 110 interacts with the appropriate module to send the alert message to the corresponding handset. For example, the controller 206 interacts with the analog module 214 if the alert message is to be sent to an analog

phone; likewise, the controller 206 interacts with the DECT module 216 if the alert message is to be sent to a DECT compatible handset.

In one embodiment, the controller 206 sends a beep/alarm tone to the phone/handset alerting a user that they are on battery power before sending a dial-tone to the phone/handset. In another embodiment, the controller 206 sends a beep/alarm tone to the phone/handset alerting a user that they are on battery power while a call is in progress.

In a further embodiment, the controller 206 sends a voice message to the phone/handset alerting a user that they are on battery power before sending a dial-tone to the phone/handset. The voice message can be sent to the phone/handset via a wave stream, pulse code modulation (pcm) audio, etc., either before the dial-tone is played or the voice message may be mixed in with the dial-tone. In another embodiment, the controller 206 sends the voice message to the phone/handset alerting a user that they are on battery power while a call is in progress. In this embodiment, the controller 206 determines if the phone/handset is in use and the voice message is mixed in with the audio of the call in progress and may be played at a predetermined low volume level so a user can hear the voice message but continue to conduct the phone call. As an example, the voice message may recite "your gateway has lost power, please conserve your battery". It is to be appreciated that the voice message(s) may be prerecorded and stored in a memory of the gateway 110, e.g., memory 218, in various audio formats or streams. In this manner, the controller 206 retrieves an appropriate message from memory and transmits or streams the retrieved message to the phone/handset.

In yet another embodiment, a text message 402 indicating loss of power may be sent to a display screen 404 of a DECT compatible phone/handset 116, as shown in FIG. 4A. Additionally, a graphic image indicating loss of power may be sent to a display screen 404 of a DECT compatible phone/handset 116.

Returning to FIG. 3, after the alert message is sent to the device, the controller 206 interacts with the battery management module 222 to determine the charge left on the battery, i.e., the operational time left on the battery, step 314. The controller

206 may poll the battery management module 222 to determine the charge remaining or the battery management module 222 may periodically transmit a signal indicating the charge remaining to the controller 206. Next, in step 316, the controller 206 sends an indication of the remaining charge on the battery to a device on the home network, e.g., to an analog phone 120 or DECT handset 116. In one embodiment, the controller 206 sends a beep/alarm tone, e.g., one beep or tone for each hour remaining of battery life. In another embodiment, the controller 206 send a voice message to the phone/handset, either before the dial-tone is sent or while the call is in progress. As an example, the voice message may recite "your gateway battery has 2 hours left, please conserve your battery". As described above, if the controller 206 determines that the phone/handset is in use, the voice message is played at a predetermined low volume level so a user can hear the voice message but continue to conduct the phone call. Additionally, it is to be appreciated that the voice message(s) may be prerecorded and stored in a memory of the gateway 110, e.g., memory 218. In this manner, the controller 206 retrieves an appropriate message from memory and transmits the retrieved message to the phone/handset. In a further embodiment, a graphic image 406 indicating the remaining charge of the battery may be sent to a display screen 404 of a DECT compatible phone/handset 116, as shown in FIG. 4B.

Then, in step 318, the controller 206 determines if power has been restored. If power has not been restored, the controller 206 waits a predetermined period of time, step 320, before determining a new value for the charge left on the battery. Alternatively, if the controller 206 determines the power has been restored, e.g., by receiving a signal from the battery management module 222, the controller 206 will restore operation of any component that was shut down upon the power loss and will then return to monitoring the main input power to the gateway.

Although the techniques of the present disclosure have been described in relation to sending alerts when a loss of power to the gateway has occurred, it is to be appreciated the techniques described may be employed for sending other types of alerts. For example, the gateway can provide alerts relating to hardware (HW) diagnostics such as thermal alerts (i.e., hardware overheating) or other hardware failures detected. In one embodiment, the gateway may send an alert when any new

device (e.g., a computer, tablet, smartphone, etc.) connects to the home network 103.

5 In another embodiment, the gateway 110 sends an alert to a device that is not directly connected to the home network 103 but coupled to the home network via other networks such as the Internet. In this embodiment, the gateway 110 is configured to send an alert to a mobile phone, e.g., a cellular phone, when the user is not at home. Referring to FIG. 5, an information distribution network 500 in accordance with another embodiment is illustrated. Network 500 is similar to network 100 shown in FIG. 1, therefore, similar components will not be described again in detail. In this embodiment, the gateway 110 is configured to send an alert message to a mobile phone 502 of a user or consumer associated to the home 104. The gateway 110 sends an alert message via a predetermined protocol, e.g., via Simple Network Message Protocol (SNMP) or Broadband Forum Technical Report (TR) -069 (also 15 known as CPE WAN Management Protocol or CWMP) to a server coupled to the Internet 504. It is to be appreciated that the alert message may be sent to the server via transmission lines 102 and 506, via wired or wireless means, and/or the alert message may be sent to the server via the headend 106. The server then routes the message to an appropriate cellular service provider 508, which then relays the alert message to the mobile phone 502. The message to the mobile phone 502 may be in the form of a text message including alphanumeric characters or graphics such as those shown and described in relation to FIGS. 4A and 4B and/or may be in the form of a voice message. Other messaging systems employed by cellular service providers, such as e-mail, is contemplated to be within the scope of the present 25 disclosure.

It is to be appreciated that the alert messages can be configured remotely by an operator with the service provider or by the consumer. In one embodiment, a graphical user interface, e.g., a web page, is provided for the user to configure the alerts. In this embodiment, the user may configure the types of changes in operational status that will trigger an alert. Additionally, the user may configure the alert to be sent, e.g., record a voice message, upload graphics, etc., and/or configure a cell phone number to send Short Message Service (SMS) alerts to. Furthermore, the operator of the service provider may configure the alerts via SNMP or TR-069. In 30

one example, the operator may configure how often the controller 206 polls the gateway for changes in operational status to generate an alert.

It is to be appreciated that the various features shown and described are
5 interchangeable, that is a feature shown in one embodiment may be incorporated into another embodiment.

A method and apparatus for alerting a user upon a change in operational status of a home network device (e.g., upon loss in power of a gateway device) are
10 provided. A home network device or apparatus may include a plurality of operational states that may be identified as by an operational status. The operational status may include operational status that is not using a backup battery for a status and operational status that is using the backup battery. The present disclosure relates to sending alerts (e.g., an alert related to battery backup operation of the gateway) to a
15 handset (analog or DECT) operating in the home and using the gateway device as an interface. The alert may be sent as a text or as a voice message and mixed with an ongoing or existing call. The system and method of the present disclosure help to notify the user of the state change (e.g., operating on the battery backup) to alert the user to consider conserving the battery life.

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Although embodiments which incorporate the teachings of the present disclosure have been shown and described in detail herein, those skilled in the art can readily devise many other varied embodiments that still incorporate these teachings. Aspects of the embodiments described herein may be incorporated
25 individually or combined to form further embodiments incorporating the teachings of the present disclosure. Having described preferred embodiments of a gateway alert system and method for alerting a user upon a change in operational status of a home network device (which are intended to be illustrative and not limiting), it is noted that modifications and variations can be made by persons skilled in the art in light of the above teachings. It is therefore to be understood that changes may be made in the
30 particular embodiments of the disclosure disclosed which are within the scope of the disclosure as outlined by the appended claims.

WHAT IS CLAIMED IS:

1. A method comprising:
 - 5 determining (306) an operational status for a home network device (110), the operational status including a first operational status indicating that the home network device (110) is not using a battery (226) for a power source and a second operational status indicating that the home network device (110) is using the battery (226) for the power source; and
 - 10 sending (312) a message to a device (116, 120) connected to the home network device (110) in order to alert a user to a change in the operational status for the home network device (110) if it is determined that the operational status for the home network device (110) has changed from the first operational status to the second operational status.
- 15 2. The method of claim 1, wherein the home network device (110) is a gateway device and the device (116, 120) connected to the home network device is a phone device.
- 20 3. The method of claim 2, wherein the phone device is a wireless phone device.
4. The method of claim 2, wherein the message is sent before providing a dial-tone to the phone device.
- 25 5. The method of claim 1, wherein the message is a voice message.
6. The method of claim 5, further comprising determining if the device (116,120) is currently in use.
- 30 7. The method of claim 6, wherein the voice message is mixed in with an audio signal provided to the device (116,120) if it is determined that the device (116,120) is currently in use.
8. The method of claim 1, wherein the message is a text message (402).

9. The method of claim 8, wherein the text message includes a graphic (406) representing the operational status of the home network device (110).

5 10. The method of claim 1, wherein the message includes an indication of an amount of time remaining of battery use.

11. The method of claim 1, wherein the home network device (110) is further coupled to an external network (504), the method further comprising sending the
10 message to at least one second device (502) coupled to the home network device (110) through the external network (504).

12. An apparatus (110) comprising:

a battery management module (222) that determines an operational status for
15 the apparatus (110), the operational status including a first operational status indicating that the apparatus (110) is not using a battery (226) for a power source and a second operational status indicating that apparatus (110) is using the battery (226) for the power source; and

a controller (206) coupled to the battery management module (222), the
20 controller (206) sending a message to a device (116, 120) connected to the apparatus (110) in order to alert a user to a change in the operational status for the apparatus (110) if it is determined that the operational status for the apparatus (110) has changed from the first operational status to the second operational status.

25 13. The apparatus (110) of claim 12, wherein the device (116, 120) connected to the apparatus (110) is a phone device.

14. The apparatus (110) of claim 13, wherein the phone device is a wireless
phone device.

30

15. The apparatus (110) of claim 13, wherein the message is sent before providing a dial-tone to the phone device.

16. The apparatus (110) of claim 12, wherein the message is a voice message.

17. The apparatus (110) of claim 16, wherein the controller (206) determines if the device (116, 120) is currently in use.

5 18. The apparatus (110) of claim 17, wherein the controller (206) mixes the voice message in with an audio signal provided to the device (116,120) if it is determined that the device (116,120) is currently in use

19. The apparatus (110) of claim 12, wherein the message is a text message
10 (402).

20. The apparatus (110) of claim 19, wherein the text message includes a graphic image (406) representing the operational status.

15 21. The apparatus (110) of claim 12, wherein the message includes an indication of an amount of time remaining of battery use.

22. The apparatus (110) of claim 12, wherein the apparatus (110) is coupled to an external network (504) and wherein the controller (206) is further configured to send
20 the message to at least one second device (502) coupled to the apparatus (110) through the external network (504).

23. An apparatus comprising:

means for determining (222) an operational status for the apparatus (110), the
25 operational status including a first operational status indicating that the apparatus (110) is not using a battery (226) for a power source and a second operational status indicating that the apparatus (110) is using the battery (226) for the power source;
and

means for sending a message (206) to a device (116, 120) connected to the
30 apparatus (110) in order to alert a user to a change in the operational status for the apparatus (110) if it is determined that the operational status for the apparatus (110) has changed from the first operational status to the second operational status.

24. The apparatus of claim 23, wherein the apparatus (110) is a gateway device and the device (116, 120) connected to the home network device is a phone device.

25. The apparatus of claim 24, wherein the phone device is a wireless phone
5 device.

26. The apparatus of claim 25, wherein the message is sent before providing a dial-tone to the phone device (116, 120).

10 27. The apparatus of claim 23, wherein the message is a voice message.

28. The apparatus of claim 27, further comprising means for determining if the device (116, 120) is currently in use.

15 29. The apparatus of claim 28, further comprising means for mixing the voice message in with an audio signal provided to the device if it is determined that the device (116, 120) is currently in use.

30. The apparatus of claim 23, wherein the message is a text message (402).
20

31. The apparatus of claim 30, wherein the text message includes a graphic (406) representing the operational status of the apparatus (110).

32. The apparatus of claim 23, wherein the message includes an indication of an
25 amount of time remaining of battery use.

33. The apparatus of claim 23, wherein the apparatus (110) is further coupled to an external network (504), the apparatus (110) further comprising means for sending the message to at least one second device (502) coupled to the apparatus (110)
30 through the external network (504).

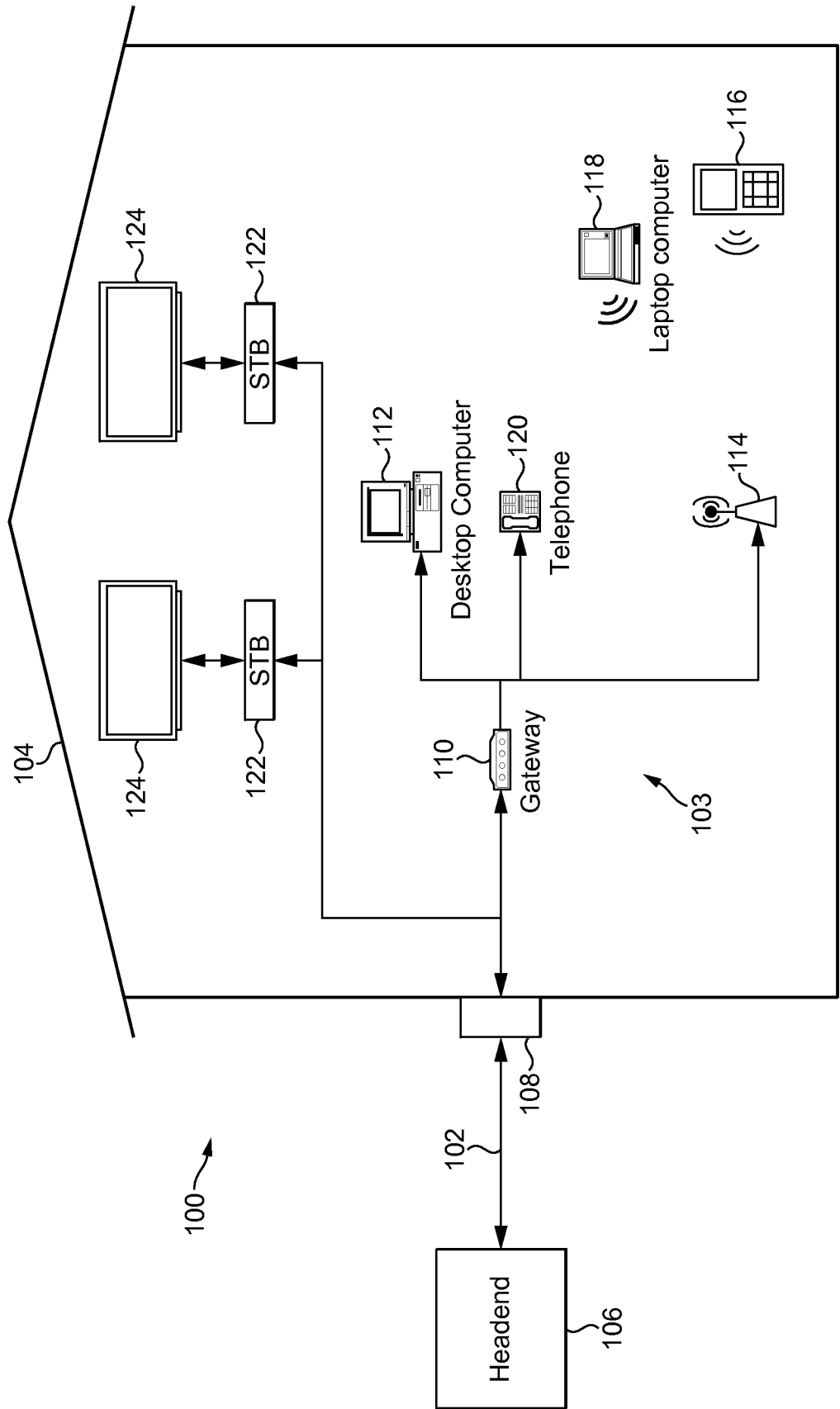


FIG. 1

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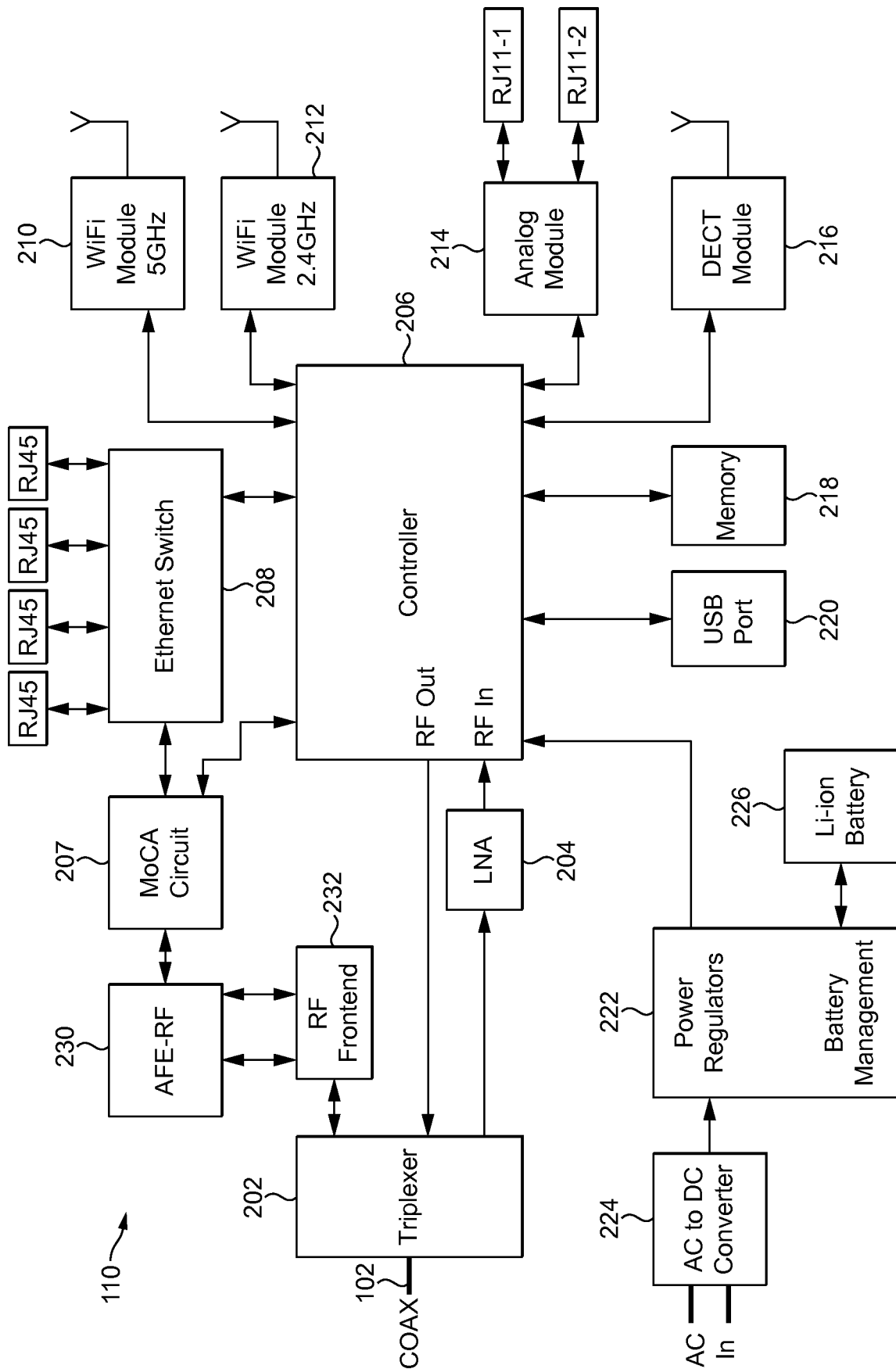


FIG. 2

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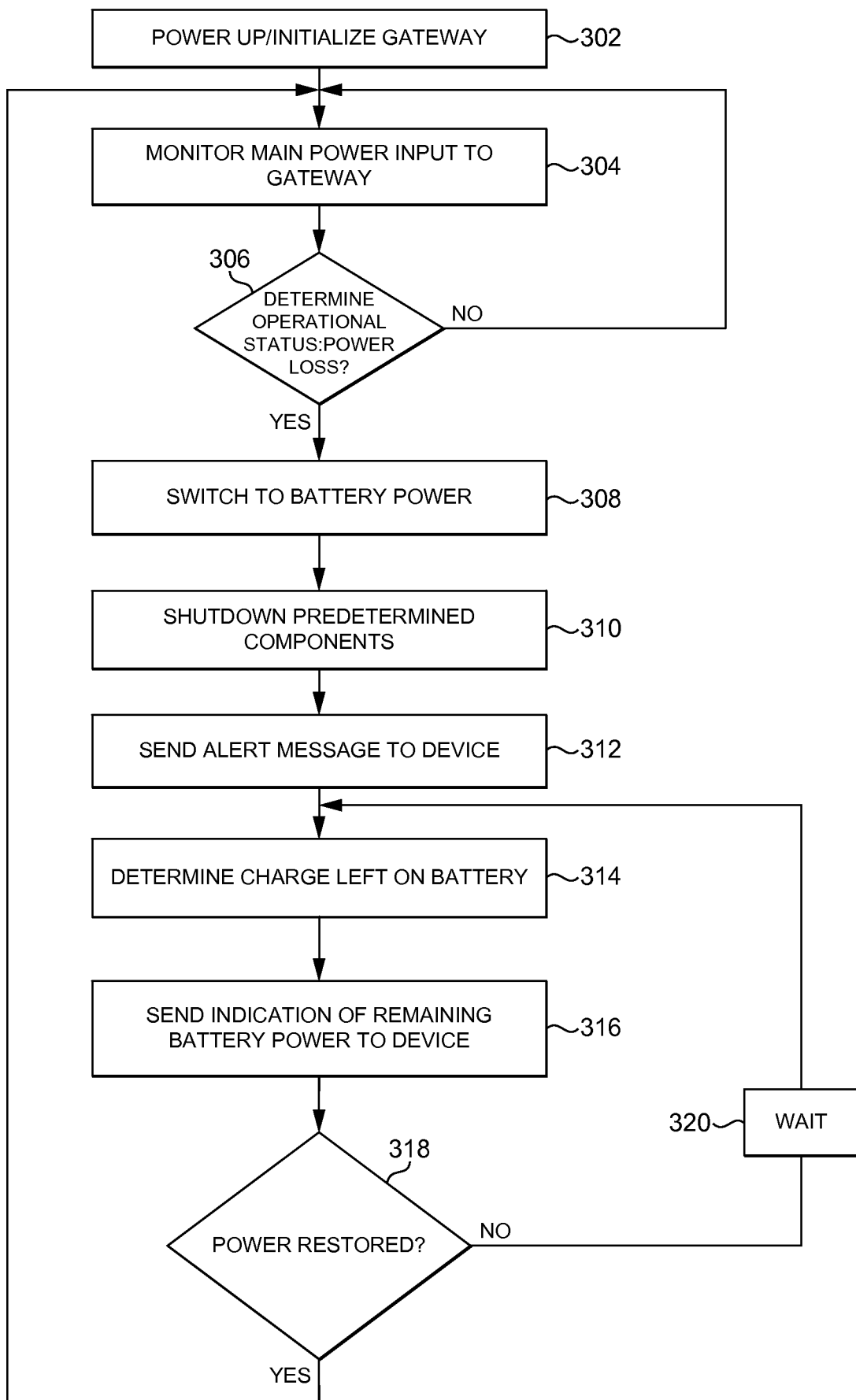


FIG. 3

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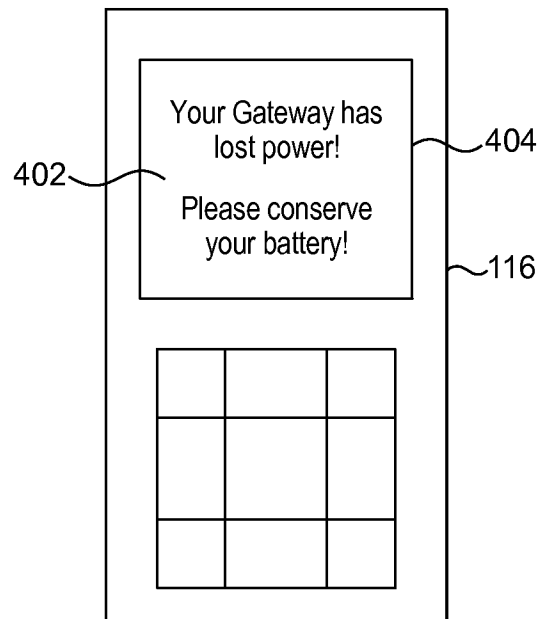


FIG. 4A

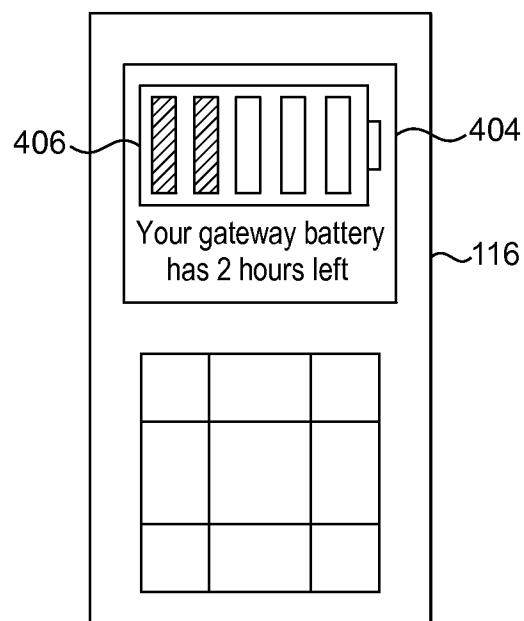


FIG. 4B

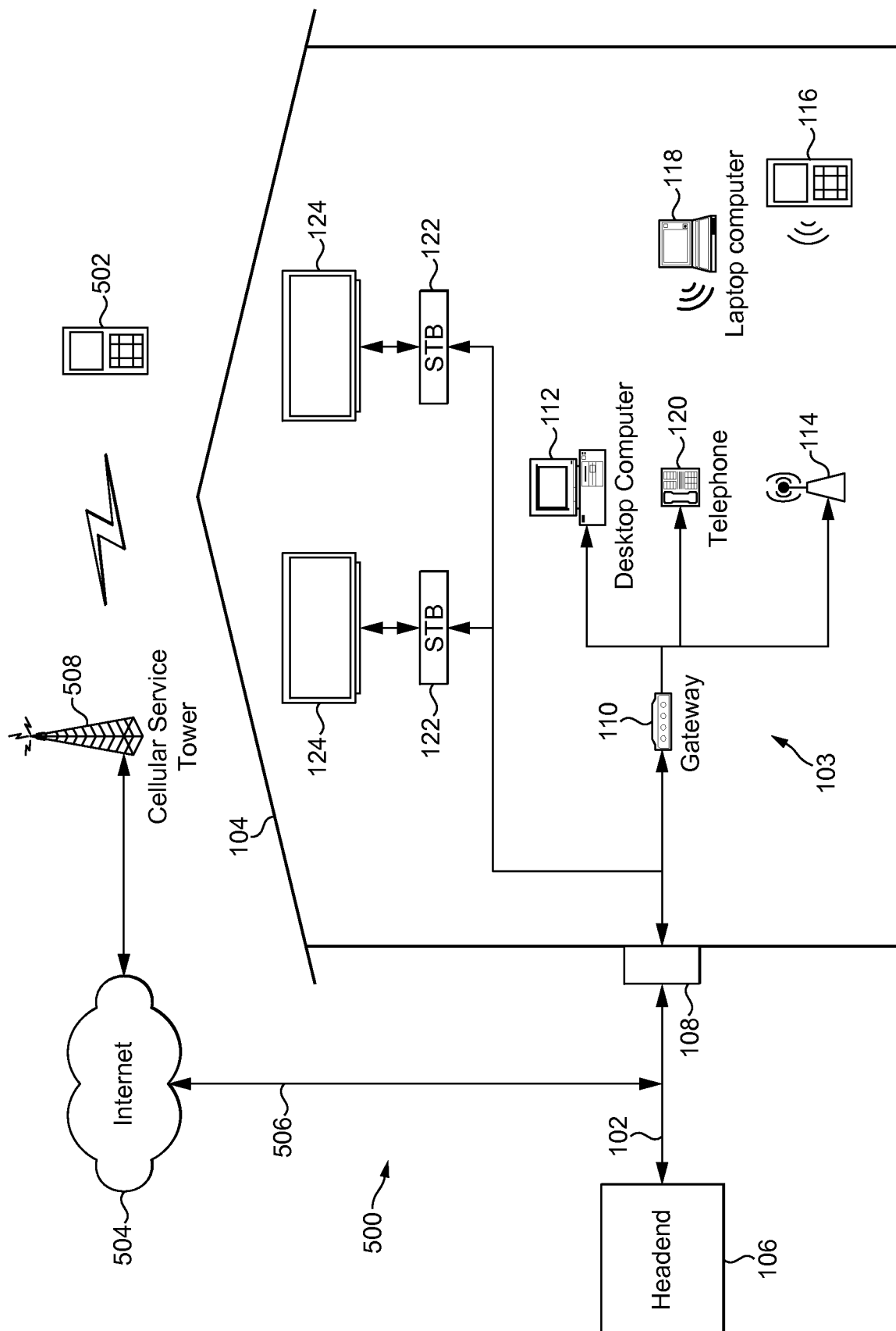


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/031297

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04M7/00 H04L12/28 H04L29/06
ADD.

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)
H04M H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/033676 A1 (MUNDRA SATISH KUMAR [US] ET AL) 9 February 2012 (2012-02-09) paragraph [0033] - paragraph [0034] paragraph [0090] - paragraph [0108] -----	1, 12, 23
X	EP 2 007 122 A1 (GEN INSTRUMENT CORP [US]) 24 December 2008 (2008-12-24)	1-10, 12-21, 23-32
Y	paragraph [0015] paragraph [0015] - paragraph [0026] -----	11, 22, 33
X	US 2009/153338 A1 (KOMOSA MARK [US]) 18 June 2009 (2009-06-18) paragraph [0016] - paragraph [0018] ----- -/--	1-10, 12-21, 23-32

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

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

13 August 2015

Date of mailing of the international search report

21/08/2015

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/031297

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

International application No

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