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(54) Title: MEDIA DEVICES CONFIGURED TO INTERFACE WITH INFORMATION APPLIANCES

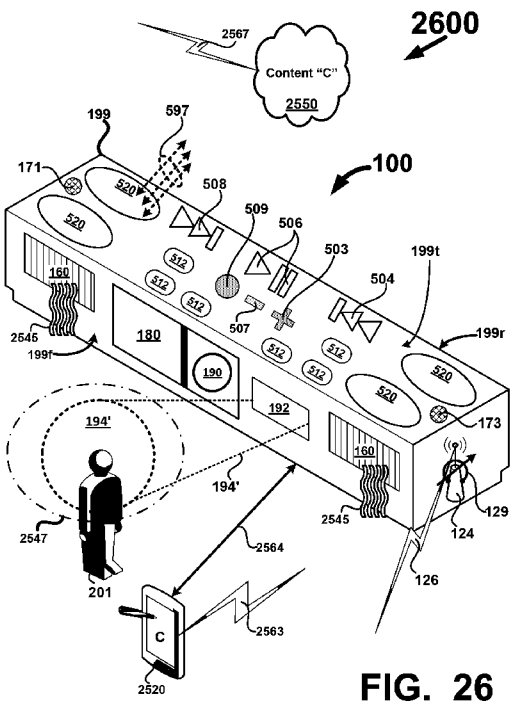

FIG. 26

(57) Abstract: Embodiments relate generally to electrical/electronic hardware, computer software, wired and wireless network communications, portable, wearable, and stationary media devices. RF transceivers and/or audio system in each media device may be used to wirelessly communicate between media devices and allow configuration and other data to be wirelessly transmitted from one media device to another media device. The proximity detection system may be configured to detect a presence of a user or multiple users and upon detecting presence, access content on a user device, and record the content while also playing back the content on the media device. One or more user devices in proximity of the media device post detection may wirelessly communicate with the media device and the media device may orchestrate handling of content from those devices or from a wirelessly accessible location such as the Cloud or Internet.

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MEDIA DEVICES CONFIGURED TO INTERFACE WITH INFORMATION APPLIANCES

FIELD

Embodiments of the present application relate generally to electrical and electronic hardware, computer software, wired and wireless network communications, wearable, hand held, and portable computing devices for facilitating communication of information. More specifically, disclosed are media devices that include image projection systems and/or binaural microphone systems.

BACKGROUND

Conventional paradigms for media devices require a user to take some action using a finger press to a touch screen or press a button, or the like, in order to initiate some function on the device, such as listening to music, for example. Conventional media devices are not configured to recognize and act on user preferences as to how the media device serves the user's needs based on changing circumstances and changing environments the user and media device are subject to. Furthermore, conventional media devices are typically personal devices that are mostly if not always used solely by the user and are therefore not well adapted to servicing the needs of friends, guests, or the like who may want to share content on their devices with the user.

Thus, there is a need for devices, systems, methods, and software that allow a user to configure (e.g., wirelessly) a media device to detect a user's presence, take an action based on the user's presence, and allow for content from a user device or many devices to be handled based on their proximity to the media device.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments or examples ("examples") of the present application are disclosed in the following detailed description and the accompanying drawings. The drawings are not necessarily to scale:

FIG. 1 depicts a block diagram of one example of a media device according to an embodiment of the present application;

FIG. 2A depicts one example of a configuration scenario for a user device and a media device according to an embodiment of the present application;

FIG. 2B depicts example scenarios for another media device being configured using a configuration from a previously configured media device according to an embodiment of the present application;

FIG. 3 depicts one example of a flow diagram of a process for installing an application on a user device and configuring a first media device using the application according to an embodiment of the present application;

FIGS. 4A and 4B depict example flow diagrams for processes for configuring an un-configured media device according to embodiments of the present application;

FIG. 5 depicts a profile view of one example of a media device including control elements and proximity detection islands according to embodiments of the present application;

FIG. 6 depicts a block diagram of one example of a proximity detection island according to embodiments of the present application;

FIG. 7 depicts a top plan view of different examples of proximity detection island configurations according to embodiments of the present application;

FIG. 8A is a top plan view depicting an example of proximity detection island coverage according to embodiments of the present application;

FIG. 8B is a front side view depicting an example of proximity detection island coverage according to embodiments of the present application;

FIG. 8C is a side view depicting an example of proximity detection island coverage according to embodiments of the present application;

FIG. 9 is a top plan view of a media device including proximity detection islands configured to detect presence according to embodiments of the present application;

FIG. 10 depicts one example of a flow for presence detection, notification, and media device readiness according to embodiments of the present application;

FIG. 11 depicts another example of a flow for presence detection, notification, and media device readiness according to embodiments of the present application;

FIG. 12 depicts yet another example of a flow for presence detection, notification, and media device readiness according to embodiments of the present application;

FIG. 13 depicts one example of presence detection using proximity detection islands and/or other systems responsive to wireless detection of different users and/or different user devices according to embodiments of the present application;

FIG. 14 depicts one example of proximity detection islands associated with specific device functions according to embodiments of the present application;

FIG. 15 depicts one example of content handling from a user device subsequent to proximity detection according to embodiments of the present application;

FIG. 16 depicts another example of content handling from user devices subsequent to proximity detection according to embodiments of the present application;

FIG. 17 depicts one example of content handling from a data capable wristband or wristwatch subsequent to proximity detection according to embodiments of the present application;

FIG. 18 depicts another example of content handling from a data capable wristband or wristwatch subsequent to proximity detection according to embodiments of the present application;

FIG. 19 depicts one example of a flow for content handling on a media device post proximity detection according to embodiments of the present application;

FIG. 20 depicts one example of a flow for storing, recording, and queuing content post proximity detection according to embodiments of the present application;

FIG. 21 depicts one example of a media device handling, storing, queuing, and taking action on content from a plurality of user devices according to embodiments of the present application;

FIG. 22 depicts another example of a media device handling, storing, queuing, and taking action on content from a plurality of user devices according to embodiments of the present application;

FIG. 23 depicts one example of a flow for recording user content on a media device while the media device handles current content according to embodiments of the present application;

FIG. 24 depicts one example of queuing action for user content in a queue of a media player according to embodiments of the present application;

FIG. 25 depicts one example of a media device for audio and video projection of media presentations according to embodiments of the present application;

FIG. 26 depicts another example of a media device for audio and video projection of media presentations according to embodiments of the present application;

FIG. 27 depicts one example of a structure for housing binaural microphones according to embodiments of the present application;

FIG. 28 depicts one example of an image size of a projected image according to embodiments of the present application; and

FIG. 29 depicts one example of images from multiple sources being projected according to embodiments of the present application;

FIG. 30 illustrates an example of a media device configured to facilitate image projection of images with or without three-dimensional ("3D") audio space generation and/or reproduction, according to some embodiments; and

FIG. 31 illustrates an example of a media device configured to facilitate image projection of images in communication with an information appliance, according to some embodiments.

DETAILED DESCRIPTION

Various embodiments or examples may be implemented in numerous ways, including as a system, a process, a method, an apparatus, a user interface, or a series of program instructions on a non-transitory computer readable medium such as a computer readable storage medium or a computer network where the program instructions are sent over optical, electronic, or wireless communication links. In general, operations of disclosed processes may be performed in an arbitrary order, unless otherwise provided in the claims.

A detailed description of one or more examples is provided below along with accompanying figures. The detailed description is provided in connection with such examples, but is not limited to any particular example. The scope is limited only by the claims and numerous alternatives, modifications, and equivalents are encompassed. Numerous specific details are set forth in the following description in order to provide a thorough understanding. These details are provided for the purpose of example and the described techniques may be practiced according to the claims without some or all of these specific details. For clarity, technical material that is known in the technical fields related to the examples has not been described in detail to avoid unnecessarily obscuring the description.

FIG. 1 depicts a block diagram of one embodiment of a media device 100 having systems including but not limited to a controller 101, a data storage (DS) system 103, a input/output (I/O) system 105, a radio frequency (RF) system 107, an audio/video (A/V) system 109, a power system 111, and a proximity sensing (PROX) system 113. A bus 110 enables electrical communication between the controller 101, DS system 103, I/O system 105, RF system 107, AV system 109, power system 111, and PROX system 113. Power bus 112 supplies electrical power from power system 111 to the controller 101, DS system 103, I/O system 105, RF system 107, AV system 109, and PROX system 113.

Power system 111 may include a power source internal to the media device 100 such as a battery (e.g., AAA or AA batteries) or a rechargeable battery (e.g., such as a lithium ion or nickel metal hydride type battery, etc.) denoted as BAT 135. Power system 111 may be electrically

coupled with a port 114 for connecting an external power source (not shown) such as a power supply that connects with an external AC or DC power source. Examples include but are not limited to a wall wart type of power supply that converts AC power to DC power or AC power to AC power at a different voltage level. In other examples, port 114 may be a connector (e.g., an IEC connector) for a power cord that plugs into an AC outlet or other type of connecter, such as a universal serial bus (USB) connector. Power system 111 provides DC power for the various systems of media device 100. Power system 111 may convert AC or DC power into a form usable by the various systems of media device 100. Power system 111 may provide the same or different voltages to the various systems of media device 100. In applications where a rechargeable battery is used for BAT 135, the external power source may be used to power the power system 111, recharge BAT 135, or both. Further, power system 111 on its own or under control or controller 101 may be configured for power management to reduce power consumption of media device 100, by for example, reducing or disconnecting power from one or more of the systems in media device 100 when those systems are not in use or are placed in a standby or idle mode. Power system 111 may also be configured to monitor power usage of the various systems in media device 100 and to report that usage to other systems in media device 100 and/or to other devices (e.g., including other media devices 100) using one or more of the I/O system 105, RF system 107, and AV system 109, for example. Operation and control of the various functions of power system 111 may be externally controlled by other devices (e.g., including other media devices 100).

Controller 101 controls operation of media device 100 and may include a non-transitory computer readable medium, such as executable program code to enable control and operation of the various systems of media device 100. DS 103 may be used to store executable code used by controller 101 in one or more data storage mediums such as ROM, RAM, SRAM, RAM, SSD, Flash, etc., for example. Controller 101 may include but is not limited to one or more of a microprocessor (μP), a microcontroller (μP), a digital signal processor (DSP), a baseband processor, an application specific integrated circuit (ASIC), just to name a few. Processors used for controller 101 may include a single core or multiple cores (e.g., dual core, quad core, etc.). Port 116 may be used to electrically couple controller 101 to an external device (not shown).

DS system 103 may include but is not limited to non-volatile memory (e.g., Flash memory), SRAM, DRAM, ROM, SSD, just to name a few. In that the media device 100 in some applications is designed to be compact, portable, or to have a small size footprint, memory in DS

103 will typically be solid state memory (e.g., no moving or rotating components); however, in some application a hard disk drive (HDD) or hybrid HDD may be used for all or some of the memory in DS 103. In some examples, DS 103 may be electrically coupled with a port 128 for connecting an external memory source (e.g., USB Flash drive, SD, SDHC, SDXC, microSD, Memory Stick, CF, SSD, etc.). Port 128 may be a USB or mini USB port for a Flash drive or a card slot for a Flash memory card. In some examples as will be explained in greater detail below, DS 103 includes data storage for configuration data, denoted as CFG 125, used by controller 101 to control operation of media device 100 and its various systems. DS 103 may include memory designate for use by other systems in media device 100 (e.g., MAC addresses for WiFi 130, network passwords, data for settings and parameters for A/V 109, and other data for operation and/or control of media device 100, etc.). DS 103 may also store data used as an operating system (OS) for controller 101. If controller 101 includes a DSP, then DS 103 may store data, algorithms, program code, an OS, etc. for use by the DSP, for example. In some examples, one or more systems in media device 100 may include their own data storage systems.

I/O system 105 may be used to control input and output operations between the various systems of media device 100 via bus 110 and between systems external to media device 100 via port 118. Port 118 may be a connector (e.g., USB, HDMI, Ethernet, fiber optic, Toslink, Firewire, IEEE 1394, or other) or a hard wired (e.g., captive) connection that facilitates coupling I/O system 105 with external systems. In some examples port 118 may include one or more switches, buttons, or the like, used to control functions of the media device 100 such as a power switch, a standby power mode switch, a button for wireless pairing, an audio muting button, an audio volume control, an audio mute button, a button for connecting/disconnecting from a WiFi network, an infrared (IR) transceiver, just to name a few. I/O system 105 may also control indicator lights, audible signals, or the like (not shown) that give status information about the media device 100, such as a light to indicate the media device 100 is powered up, a light to indicate the media device 100 is in wireless communication (e.g., WiFi, Bluetooth®, WiMAX, cellular, etc.), a light to indicate the media device 100 is Bluetooth® paired, in Bluetooth® pairing mode, Bluetooth® communication is enabled, a light to indicate the audio and/or microphone is muted, just to name a few. Audible signals may be generated by the I/O system 105 or via the AV system 107 to indicate status, etc. of the media device 100. Audible signals may be used to announce Bluetooth® status, powering up or down the media device 100, muting the audio or microphone, an incoming phone call, a new message such as a text, email, or SMS,

just to name a few. In some examples, I/O system 105 may use optical technology to wirelessly communicate with other media devices 100 or other devices. Examples include but are not limited to infrared (IR) transmitters, receivers, transceivers, an IR LED, and an IR detector, just to name a few. I/O system 105 may include an optical transceiver OPT 185 that includes an optical transmitter 185t (e.g., an IR LED) and an optical receiver 185r (e.g., a photo diode). OPT 185 may include the circuitry necessary to drive the optical transmitter 185t with encoded signals and to receive and decode signals received by the optical receiver 185r. Bus 110 may be used to communicate signals to and from OPT 185. OPT 185 may be used to transmit and receive IR commands consistent with those used by infrared remote controls used to control AV equipment, televisions, computers, and other types of systems and consumer electronics devices. The IR commands may be used to control and configure the media device 100, or the media device 100 may use the IR commands to configure/re-configure and control other media devices or other user devices, for example.

RF system 107 includes at least one RF antenna 124 that is electrically coupled with a plurality of radios (e.g., RF transceivers) including but not limited to a Bluetooth® (BT) transceiver 120, a WiFi transceiver 130 (e.g., for wireless communications over a wireless and/or WiMAX network), and a proprietary Ad Hoc (AH) transceiver 140 pre-configured (e.g., at the factory) to wirelessly communicate with a proprietary Ad Hoc wireless network (AH-WiFi) (not shown). AH 140 and AH-WiFi are configured to allow wireless communications between similarly configured media devices (e.g., an ecosystem comprised of a plurality of similarly configured media devices) as will be explained in greater detail below. RF system 107 may include more or fewer radios than depicted in FIG. 1 and the number and type of radios will be application dependent. Furthermore, radios in RF system 107 need not be transceivers, RF system 107 may include radios that transmit only or receive only, for example. Optionally, RF system 107 may include a radio 150 configured for RF communications using a proprietary format, frequency band, or other existent now or to be implemented in the future. Radio 150 may be used for cellular communications (e.g., 3G, 4G, or other), for example. Antenna 124 may be configured to be a de-tunable antenna such that it may be de-tuned 129 over a wide range of RF frequencies including but not limited to licensed bands, unlicensed bands, WiFi, WiMAX, cellular bands, Bluetooth®, from about 2.0GHz to about 6.0GHz range, and broadband, just to name a few. As will be discussed below, PROX system 113 may use the de-tuning 129 capabilities of antenna 124 to sense proximity of the user, other people, the relative locations of

other media devices 100, just to name a few. Radio 150 (e.g., a transceiver) or other transceiver in RF 107, may be used in conjunction with the de-tuning capabilities of antenna 124 to sense proximity, to detect and or spatially locate other RF sources such as those from other media devices 100, devices of a user, just to name a few. RF system 107 may include a port 123 configured to connect the RF system 107 with an external component or system, such as an external RF antenna, for example. The transceivers depicted in FIG. 1 are non-limiting examples of the type of transceivers that may be included in RF system 107. RF system 107 may include a first transceiver configured to wirelessly communicate using a first protocol, a second transceiver configured to wirelessly communicate using a second protocol, a third transceiver configured to wirelessly communicate using a third protocol, and so on. One of the transceivers in RF system 107 may be configured for short range RF communications, such as within a range from about 1 meter to about 15 meters, or less, for example. Another one of the transceivers in RF system 107 may be configured for long range RF communications, such any range up to about 50 meters or more, for example. Short range RF may include Bluetooth®; whereas, long range RF may include WiFi, WiMAX, cellular, and Ad Hoc wireless, for example.

AV system 109 includes at least one audio transducer, such as a loud speaker 160, a microphone 170, or both. AV system 109 further includes circuitry such as amplifiers, preamplifiers, or the like as necessary to drive or process signals to/from the audio transducers. Optionally, AV system 109 may include a display (DISP) 180, video device (VID) 190 (e.g., an image captured device or a web CAM, etc.), or both. DISP 180 may be a display and/or touch screen (e.g., a LCD, OLED, or flat panel display) for displaying video media, information relating to operation of media device 100, content available to or operated on by the media device 100, playlists for media, date and/or time of day, alpha-numeric text and characters, caller ID, file/directory information, a GUI, just to name a few. A port 122 may be used to electrically couple AV system 109 with an external device and/or external signals. Port 122 may be a USB, HDMI, Firewire/IEEE-1394, 3.5 mm audio jack, or other. For example, port 122 may be a 3.5mm audio jack for connecting an external speaker, headphones, earphones, etc. for listening to audio content being processed by media device 100. As another example, port 122 may be a 3.5mm audio jack for connecting an external microphone or the audio output from an external device. In some examples, SPK 160 may include but is not limited to one or more active or passive audio transducers such as woofers, concentric drivers, tweeters, super tweeters, midrange drivers, sub-woofers, passive radiators, just to name a few. MIC 170 may include one or more

microphones and the one or more microphones may have any polar pattern suitable for the intended application including but not limited to omni-directional, directional, bi-directional, uni-directional, bi-polar, uni-polar, any variety of cardioid pattern, and shotgun, for example. MIC 170 may be configured for mono, stereo, or other. MIC 170 may be configured to be responsive (e.g., generate an electrical signal in response to sound) to any frequency range including but not limited to ultrasonic, infrasonic, from about 20Hz to about 20kHz, and any range within or outside of human hearing. In some applications, the audio transducer of AV system 109 may serve dual roles as both a speaker and a microphone.

Circuitry in AV system 109 may include but is not limited to a digital-to-analog converter (DAC) and algorithms for decoding and playback of media files such as MP3, FLAC, AIFF, ALAC, WAV, MPEG, QuickTime, AVI, compressed media files, uncompressed media files, and lossless media files, just to name a few, for example. A DAC may be used by AV system 109 to decode wireless data from a user device or from any of the radios in RF system 107. AV system 109 may also include an analog-to-digital converter (ADC) for converting analog signals, from MIC 170 for example, into digital signals for processing by one or more system in media device 100.

Media device 100 may be used for a variety of applications including but not limited to wirelessly communicating with other wireless devices, other media devices 100, wireless networks, and the like for playback of media (e.g., streaming content), such as audio, for example. The actual source for the media need not be located on a user's device (e.g., smart phone, MP3 player, iPod, iPhone, iPad, Android, laptop, PC, etc.). For example, media files to be played back on media device 100 may be located on the Internet, a web site, or in the Cloud, and media device 100 may access (e.g., over a WiFi network via WiFi 130) the files, process data in the files, and initiate playback of the media files. Media device 100 may access or store in its memory a playlist or favorites list and playback content listed in those lists. In some applications, media device 100 will store content (e.g., files) to be played back on the media device 100 or on another media device 100.

Media device 100 may include a housing, a chassis, an enclosure or the like, denoted in FIG. 1 as 199. The actual shape, configuration, dimensions, materials, features, design, ornamentation, aesthetics, and the like of housing 199 will be application dependent and a matter of design choice. Therefore, housing 199 need not have the rectangular form depicted in FIG. 1 or the shape, configuration etc., depicted in the Drawings of the present application. Nothing

precludes housing 199 from comprising one or more structural elements, that is, the housing 199 may be comprised of several housings that form media device 100. Housing 199 may be configured to be worn, mounted, or otherwise connected to or carried by a human being. For example, housing 199 may be configured as a wristband, an earpiece, a headband, a headphone, a headset, an earphone, a hand held device, a portable device, a desktop device, just to name a few.

In other examples, housing 199 may be configured as speaker, a subwoofer, a conference call speaker, an intercom, a media playback device, just to name a few. If configured as a speaker, then the housing 199 may be configured as a variety of speaker types including but not limited to a left channel speaker, a right channel speaker, a center channel speaker, a left rear channel speaker, a right rear channel speaker, a subwoofer, a left channel surround speaker, a right channel surround speaker, a left channel height speaker, a right channel height speaker, any speaker in a 3.1, 5.1, 7.1, 9.1 or other surround sound format including those having two or more subwoofers or having two or more center channels, for example. In other examples, housing 199 may be configured to include a display (e.g., DISP 180) for viewing video, serving as a touch screen interface for a user, providing an interface for a GUI, for example.

PROX system 113 may include one or more sensors denoted as SEN 195 that are configured to sense 197 an environment 198 external to the housing 199 of media device 100. Using SEN 195 and/or other systems in media device 100 (e.g., antenna 124, SPK 160, MIC 170, etc.), PROX system 113 senses 197 an environment 198 that is external to the media device 100 (e.g., external to housing 199). PROX system 113 may be used to sense one or more of proximity of the user or other persons to the media device 100 or other media devices 100. PROX system 113 may use a variety of sensor technologies for SEN 195 including but not limited to ultrasound, infrared (IR), passive infrared (PIR), optical, acoustic, vibration, light, ambient light sensor (ALS), IR proximity sensors, LED emitters and detectors, RGB LED's, RF, temperature, capacitive, capacitive touch, inductive, just to name a few. PROX system 113 may be configured to sense location of users or other persons, user devices, and other media devices 100, without limitation. Output signals from PROX system 113 may be used to configure media device 100 or other media devices 100, to re-configure and/or re-purpose media device 100 or other media devices 100 (e.g., change a role the media device 100 plays for the user, based on a user profile or configuration data), just to name a few. A plurality of media devices 100 in an eco-system of media devices 100 may collectively use their respective PROX system 113 and/or

other systems (e.g., RF 107, de-tunable antenna 124, AV 109, etc.) to accomplish tasks including but not limited to changing configuration, re-configuring one or more media devices, implement user specified configurations and/or profiles, insertion and/or removal of one or more media devices in an eco-system, just to name a few.

In other examples, PROX 113 may include one or more proximity detection islands PSEN 520 as will be discussed in greater detail in FIGS. 5 – 6. PSEN 520 may be positioned at one or more locations on chassis 199 and configured to sense an approach of a user or other person towards the media device 100 or to sense motion or gestures of a user or other person by a portion of the body such as a hand for example. PSEN 520 may be used in conjunction with or in place of one or more of SEN 195, OPT 185, SPK 160, MIC 170, RF 107 and/or de-tunable 129 antenna 124 to sense proximity and/or presence in an environment surrounding the media device 100, for example. PSEN 520 may be configured to take or cause an action to occur upon detection of an event (e.g., an approach or gesture by user 201 or other) such as emitting light (e.g., via an LED), generating a sound or announcement (e.g., via SPK 160), causing a vibration (e.g., via SPK 160 or a vibration motor), display information (e.g., via DISP 180), trigger haptic feedback, for example. In some examples, PSEN 520 may be included in I/O 105 instead of PROX 113 or be shared between one or more systems of media device 100. In other examples, components, circuitry, and functionality of PSEN 520 may vary among a plurality of PSEN 520 sensors in media device 100 such that all PSEN 520 are not identical.

Simple Out-Of-The-Box User Experience

Attention is now directed to FIG. 2A, where a scenario 200a depicts one example of a media device (e.g., media device 100 of FIG. 1 or a similarly provisioned media device) being configured for the first time by a user 201. For purposes of explanation, in FIG. 2A media device is denoted as 100a to illustrate that it is the first time the media device 100a is being configured. For example, the first configuration of media device 100a may be after it is purchased, acquired, borrowed, or otherwise by user 201, that is, the first time may be the initial out-of-the-box configuration of media device 100a when it is new. Scenario 200a depicts a desirable user experience for user 201 to achieve the objective of making the configuring of media device 100a as easy, straight forward, and fast as possible.

To that end, in FIG. 2A, scenario 200a may include media device 100a to be configured, for example, initially by user 201 using a variety of devices 202 including but not limited to a smartphone 210, a tablet 220, a laptop computer 230, a data capable wristband or the like 240, a

desktop PC or server 250, ... etc. For purposes of simplifying explanation, the following description will focus on tablet 220, although the description may apply to any of the other devices 202 as well. Upon initial power up of media device 100a, controller 101 may command RF system 107 to electrically couple 224, transceiver BT 120 with antenna 124, and command BT 120 to begin listening 126 for a BT pairing signal from device 220. Here, user 201 as part of the initialization process may have already used a Bluetooth® menu on tablet 220 to activate the BT radio and associated software in tablet 220 to begin searching (e.g., via RF) for a BT device to pair with. Pairing may require a code (e.g., a PIN number or code) be entered by the user 201 for the device being paired with, and the user 201 may enter a specific code or a default code such as "0000", for example.

Subsequently, after tablet 220 and media device 100a have successfully BT paired with one another, the process of configuring media device 100a to service the specific needs of user 201 may begin. In some examples, after successful BT pairing, BT 120 need not be used for wireless communication between media device 100a and the user's device (e.g., tablet 220 or other). Controller 101, after a successful BT pairing, may command RF system 107 to electrically couple 228, WiFi 130 with antenna 124 and wireless communications between tablet 220 and media device 100a (see 260, 226) may occur over a wireless network (e.g., WiFi or WiMAX) or other as denoted by wireless access point 270. Post-pairing, tablet 220 requires a non-transitory computer readable medium that includes data and/or executable code to form a configuration (CFG) 125 for media device 100a. For purposes of explanation, the non-transitory computer readable medium will be denoted as an application (APP) 225. APP 225 resides on or is otherwise accessible by tablet 220 or media device 100a. User 201 uses APP 225 (e.g., through a GUI, menu, drop down boxes, or the like) to make selections that comprise the data and/or executable code in the CFG 125.

APP 225 may be obtained by tablet 220 in a variety of ways. In one example, the media device 100a includes instructions (e.g., on its packaging or in a user manual) for a website on the Internet 250 where the APP 225 may be downloaded. Tablet 220 may use its WiFi or Cellular RF systems to communicate with wireless access point 270 (e.g., a cell tower or wireless router) to connect 271 with the website and download APP 255 which is stored on tablet 220 as APP 225. In another example, tablet 220 may scan or otherwise image a bar code or TAG operative to connect the tablet 220 with a location (e.g., on the Internet 250) where the APP 225 may be found and downloaded. Tablet 220 may have access to an applications store such as Google

Play for Android devices, the Apple App Store for iOS devices, or the Windows 8 App Store for Windows 8 devices. The APP 225 may then be downloaded from the app store. In yet another example, after pairing, media device 100a may be preconfigured to either provide (e.g., over the BT 120 or WiFi 130) an address or other location that is communicated to tablet 220 and the tablet 220 uses the information to locate and download the APP 225. In another example, media device 100a may be preloaded with one or more versions of APP 225 for use in different device operating systems (OS), such as one version for Android, another for iOS, and yet another for Windows 8, etc. In that OS versions and/or APP 225 are periodically updated, media device 100a may use its wireless systems (e.g., BT 120 or WiFi 130) to determine if the preloaded versions are out of date and need to be replaced with newer versions, which the media device 100a obtains, downloads, and subsequently makes available for download to tablet 220.

Regardless of how the APP 225 is obtained, once the APP 225 is installed on any of the devices 202, the user 201 may use the APP 225 to select various options, commands, settings, etc. for CFG 125 according to the user's preferences, needs, media device ecosystem, etc., for example. After the user 201 finalizes the configuration process, CFG 125 is downloaded (e.g., using BT 120 or WiFi 130) into DS system 103 in media device 100a. Controller 101 may use the CFG 125 and/or other executable code to control operation of media device 100a. In FIG. 2A, the source for APP 225 may be obtained from a variety of locations including but not limited to: the Internet 250; a file or the like stored in the Cloud; a web site; a server farm; a FTP site; a drop box; an app store; a manufactures web site; or the like, just to name a few. APP 225 may be installed using other processes including but not limited to: dragging and dropping the appropriate file into a directory, folder, desktop or the like on tablet 220; emailing the APP 225 as an attachment, a compressed or ZIP file; cutting and pasting the App 225, just to name a few.

CFG 125 may include data such as the name and password for a wireless network (e.g., 270) so that WiFi 130 may connect with (see 226) and use the wireless network for future wireless communications, data for configuring subsequently purchased devices 100, data to access media for playback, just to name a few. By using the APP 225, user 201 may update CFG 125 as the needs of the user 201 change over time, that is, APP 225 may be used to re-configure an existing CFG 125. Furthermore, APP 225 may be configured to check for updates and to query the user 201 to accept the updates such that if an update is accepted an updated version of the APP 225 may be installed on tablet 220 or on any of the other devices 202. Although the previous discussion has focused on installing the APP 225 and CFG 125, one

skilled in the art will appreciate that other data may be installed on devices 202 and/or media device 100a using the process described above. As one example, APP 225 or some other program may be used to perform software, firmware, or data updates on device 100a. DS system 103 on device 100a may include storage set aside for executable code (e.g., an operating system) and data used by controller 101 and/or the other systems depicted in FIG. 1.

Moving on to FIG. 2B, where a several example scenarios of how a previously configured media device 100a that includes CFG 125 may be used to configure another media device 100b that is initially un-configured. In scenario 200b, media device 100a is already powered up or is turned on (e.g., by user 201) or is otherwise activated such that its RF system 107 is operational. Accordingly, at stage 290a, media device 100a is powered up and configured to detect RF signatures from other powered up media devices using its RF system 107. At stage 290b another media device denoted as 100b is introduced into RF proximity of media device 100a and is powered up so that its RF system 107 is operational and configured to detect RF signatures from other powered up media devices (e.g., signature of media device 100a). Here RF proximity broadly means within adequate signal strength range of the BT transceivers 120, WiFi transceivers 130, or any other transceivers in RF system 107, RF systems in the users devices (e.g., 202, 220), and other wireless devices such as wireless routers, WiFi networks (e.g., 270), WiMAX networks, and cellular networks, for example. Adequate signal strength range is any range that allows for reliable RF communications between wireless devices. For BT enabled devices, adequate signal strength range may be determined by the BT specification, but is subject to change as the BT specification and technology evolve. For example, adequate signal strength range for BT 120 may be approximately 10 meters (e.g., ~ 30 feet). For WiFi 130, adequate signal strength range may vary based on parameters such as distance from and signal strength of the wireless network, and structures that interfere with the WiFi signal. However, in most typical wireless systems adequate signal strength range is usually greater than 10 meters.

At stage 290b, media device 100b is powered up and at stage 290c its BT 120 and the BT 120 of media device 100a recognize each other. For example, each media device (100a, 100b) may be pre-configured (e.g., at the factory) to broadcast a unique RF signature or other wireless signature (e.g., acoustic) at power up and/or when it detects the unique signature of another device. The unique RF signature may include status information including but not limited to the configuration state of a media device. Each BT 120 may be configured to allow communications with and control by another media device based on the information in the unique RF signature.

Accordingly, at the stage 290c, media device 100b transmits RF information that includes data that informs other listening BT 120's (e.g., BT 120 in 100a) that media device 100b is un-configured (e.g., has no CFG 125).

At stage 290d, media devices 100a and 100b negotiate the necessary protocols and/or handshakes that allow media device 100a to gain access to DS 103 of media device 100b. At stage 290e, media device 100b is ready to receive CFG 125 from media device 100a, and at stage 290f the CFG 125 from media device 100a is transmitted to media device 100b and is replicated (e.g., copied, written, etc.) in the DS 103 of media device 100b, such that media device 100b becomes a configured media device.

Data in CFG 125 may include information on wireless network 270, including but not limited to wireless network name, wireless password, MAC addresses of other media devices, media specific configuration such as speaker type (e.g., left, right, center channel), audio mute, microphone mute, etc. Some configuration data may be subservient to other data or dominant to other data. After the stage 290f, media device 100a, media device 100b, and user device 220 may wirelessly communicate 291 with one another over wireless network 270 using the WiFi systems of user device 220 and WiFi 130 of media devices 100a and 100b.

APP 225 may be used to input the above data into CFG 125, for example using a GUI included with the APP 225. User 201 enters data and makes menu selections (e.g., on a touch screen display) that will become part of the data for the CFG 125. APP 225 may also be used to update and/or re-configure an existing CFG 125 on a configured media device. Subsequent to the update and/or re-configuring, other configured or un-configured media devices in the user's ecosystem may be updated and/or re-configured by a previously updated and/or re-configured media device as described herein, thereby relieving the user 201 from having to perform the update and/or re-configure on several media devices. The APP 225 or a location provided by the APP 225 may be used to specify playlists, media sources, file locations, and the like. APP 225 may be installed on more than one user device 202 and changes to APP 225 on one user device may later by replicated on the APP 225 on other user devices by a synching or update process, for example. APP 225 may be stored on the internet or in the Cloud and any changes to APP 225 may be implemented in versions of the APP 225 on various user devices 202 by merely activating the APP 225 on that device and the APP 225 initiates a query process to see if any updates to the APP are available, and if so, then the APP 225 updates itself to make the version on the user device current with the latest version.

Media devices 100a and 100b having their respective WiFi 130 enabled to communicate with wireless network 270, tablet 220, or other wireless devices of user 201. FIG. 2B includes an alternate scenario 200b that may be used to configure a newly added media device, that is, an un-configured media device (e.g., 100b). For example, at stage 290d, media device 100a, which is assumed to already have its WiFi 130 configured for communications with wireless network 270, transmits over its BT 120 the necessary information for media device 100b to join wireless network 270. After stage 290d, media device 100b, media device 100a, and tablet 220 are connected 291 to wireless network 270 and may communicate wirelessly with one another via network 270. Furthermore, at stage 290d, media device 100b is still in an un-configured state. Next, at stage 290e, APP 225 is active on tablet 220 and wirelessly accesses the status of media devices 100a and 100b. APP 225 determines that media device 100b is un-configured and APP 225 acts to configure 100b by harvesting CFG 125 (e.g., getting a copy of) from configured media device 100a by wirelessly 293a obtaining CFG 125 from media device 100a and wirelessly 293b transmitting the harvested CFG 125 to media device 100b. Media device 100b uses its copy of CFG 125 to configure itself thereby placing it in a configured state.

After all the devices 220, 100a, 100b, are enabled for wireless communications with one another, FIG. 2B depicts yet another example scenario where after stage 290d, the APP 225 or any one of the media devices 100a, 100b, may access 295 the CFG 125 for media device 100b from an external location, such as the Internet, the cloud, etc. as denoted by 250 where a copy of CFG 125 may be located and accessed for download into media device 100b. APP 255, media device 100b, or media device 100a, may access the copy of CFG 125 from 250 and wirelessly install it on media device 100b.

In the example scenarios depicted in FIG. 2B, it should be noted that after the pairing of media device 100a and tablet 220 in FIG. 2A, the configuration of media device 100b in FIG. 2B did not require tablet 220 to use its BT features to pair with media device 100b to effectuate the configuration of media device 100b. Moreover, there was no need for the BT pairing between tablet 220 and media device 100a to be broken in order to effectuate the configuration of media device 100b. Furthermore, there is no need for table 220 and media devices 100a and/or 100b to be BT paired at all with tablet 220 in order to configure media device 100b. Accordingly, from the standpoint of user 201, adding a new media device to his/her ecosystem of similarly provisioned media devices does not require un-pairing with one or more already configured devices and then pairing with the new device to be added to the ecosystem. Instead, one of the

already configured devices (e.g., media device 100a having CFG 125 installed) may negotiate with the APP 225 and/or the new device to be added to handle the configuration of the new device (e.g., device 100b). Similarly provisioned media devices broadly means devices including some, all, or more of the systems depicted in FIG. 1 and designed (e.g., by the same manufacture or to the same specifications and/or standards) to operate with one another in a seamless manner as media devices are added to or removed from an ecosystem.

Reference is now made to FIG. 3 where a flow diagram 300 depicts one example of configuring a first media device using an application installed on a user device as was described above in regards to FIG. 2A. At a stage 302 a Bluetooth® (BT) discovery mode is activated on a user device such as the examples 202 of user devices depicted in FIG. 2A. Typically, a GUI on the user device includes a menu for activating BT discovery mode, after which, the user device waits to pick up a BT signal of a device seeking to pair with the user's device. At a stage 304 a first media device (e.g., 100a) is powered up (if not already powered up). At stage 306 a BT pairing mode is activated on the first media device. Examples of activating BT pairing mode include but are not limited to pushing a button or activating a switch on the first media device that places the first media device in BT pairing mode such that its BT 120 is activated to generate a RF signal that the user's device may discover while in discovery mode. I/O system 105 of media device 100 may receive 118 as a signal the activation of BT pairing mode by actuation of the switch or button and that signal is processed by controller 101 to command RF system 107 to activate BT 120 in pairing mode. In other examples, after powering up the first media device, a display (e.g., DISP 180) may include a touch screen interface and/or GUI that guides a user to activate the BT pairing mode on the first media device.

At a stage 308 the user's device and the first media device negotiate the BT pairing process, and if BT pairing is successful, then the flow continues at stage 310. If BT pairing is not successful, then the flow repeats at the stage 206 until successful BT pairing is achieved. At stage 310 the user device is connected to a wireless network (if not already connected) such as a WiFi, WiMAX, or cellular (e.g., 3G or 4G) network. At a stage 312, the wireless network may be used to install an application (e.g., APP 225) on the user's device. The location of the APP (e.g., on the Internet or in the Cloud) may be provided with the media device or after successful BT pairing, the media device may use its BT 120 to transmit data to the user's device and that data includes a location (e.g., a URI or URL) for downloading or otherwise accessing the APP. At a stage 314, the user uses the APP to select settings for a configuration (e.g., CFG 125) for the

first media device. After the user completes the configuration, at a stage 316 the user's device installs the APP on the first media device. The installation may occur in a variety of ways (see FIG. 2A) including but not limited to: using the BT capabilities of each device (e.g., 220 and 100a) to install the CFG; using the WiFi capabilities of each device to install the CFG; and having the first media device (e.g., 100a) fetch the CFG from an external source such as the Internet or Cloud using its WiFi 130; just to name a few. Optionally, at stages 318 - 324 a determination of whether or not the first media device is connected with a wireless network may be made at a stage 318. If the first media device is already connected with a wireless network the "YES" branch may be taken and the flow may terminate at stage 320. On the other hand, if the first media device is not connected with a wireless network the "NO" branch may be taken and the flow continues at a stage 322 where data in the CFG is used to connect WiFi 130 with a wireless network and the flow may terminate at a stage 324. The CFG may contain the information necessary for a successful connection between WiFi 130 and the wireless network, such as wireless network name and wireless network password, etc.

Now reference is made to FIG. 4A, where a flow diagram 400a depicts one example of a process for configuring an un-configured media device "B" (e.g., un-configured media device 100b at stage 290b of FIG. 2B) using a configured media device "A" (e.g., media device 100a having CFG 125 of FIG. 2B). At a stage 402 an already configured media device "A" is powered up. At a stage 404 the RF system (e.g., RF system 107 of FIG. 1) of configured media device "A" is activated. The RF system is configured to detect RF signals from other "powered up" media devices. At a stage 406, an un-configured media device "B" (e.g., un-configured media device 100b at stage 290b of FIG. 2B) is powered up. At a stage 408 the RF system of un-configured media device "B" is activated. At stage 408, the respective RF systems of the configured "A" and un-configured "B" media devices are configured to recognize each other (e.g., via their respective BT 120 transceivers or another transceiver in the RF system). At a stage 410, if the configured "A" and un-configured "B" media devices recognize each other, then a "YES" branch is taken to a stage 412 where the configured media device "A" transmits its configuration (e.g., CFG 125) to the un-configured media device "B" (e.g., see stages 290e and 290f in FIG. 2B). If the configured "A" and un-configured "B" media devices do not recognize each other, then a "NO" branch is taken and the flow may return to an earlier stage (e.g., stage 404 to retry the recognition process. Optionally, after being configured, media device "B" may be connected with a wireless network (e.g., via WiFi 130). At a stage 414 a determination is

made as to whether or not media device "B" is connected to a wireless network. If already connected, then a "YES" branch is taken and the process may terminate at a stage 416. However, if not connected with a wireless network, then a "NO" branch is taken and media device "B" is connected to the wireless network at a stage 418. For example, the CFG 125 that was copied to media device "B" may include information such as wireless network name and password and WiFi 130 is configured to effectuate the connection with the wireless network based on that information. Alternatively, media device "A" may transmit the necessary information to media device "B" (e.g., using BT 120) at any stage of flow 400a, such as at the stage 408, for example. After the wireless network connection is made, the flow may terminate at a stage 420.

Attention is now directed to FIG. 4B, where a flow diagram 400b depicts another example of a process for configuring an un-configured media device "B" (e.g., un-configured media device 100b at stage 290b of FIG. 2B) using a configured media device "A" (e.g., media device 100a having CFG 125 of FIG. 2B). At a stage 422 an already configured media device "A" is powered up. At a stage 424 the RF system of configured media device "A" is activated (e.g., RF system 107 of FIG. 1). The RF system is configured to detect RF signals from other "powered up" media devices. At a stage 426, an un-configured media device "B" (e.g., un-configured media device 100b at stage 290b of FIG. 2B) is powered up. At a stage 428 the RF system of un-configured media device "b" is activated (e.g., RF system 107 of FIG. 1). At the stage 428, the respective RF systems of the configured "A" and un-configured "B" media devices are configured to recognize each other (e.g., via their respective BT 120 transceivers or another transceiver in the RF system). At a stage 430, if the configured "A" and un-configured "B" media devices recognize each other, then a "YES" branch is taken to a stage 432 where the configured media device "A" transmits information for a wireless network to the un-configured media device "B" (e.g., see stage 290b in FIG. 2B) and that information is used by the un-configured media device "B" to connect with a wireless network as was described above in regards to FIGS. 2B and 4A. If the configured "A" and un-configured "B" media devices do not recognize each other, then a "NO" branch is taken and the flow may return to an earlier stage (e.g., stage 424 to retry the recognition process. At a stage 434, the information for the wireless network is used by the un-configured media device "B" to effectuate a connection to the wireless network. At a stage 436, a user device is connected with the wireless network and an application (APP) running on the user device (e.g., APP 225 in FIG. 2B) is activated. Stage 436 may be

skipped if the user device is already connected to the wireless network. The APP is aware of un-configured media device "B" presence on the wireless network and at a stage 438 detects that media device "B" is presently in an un-configured state and therefore has a status of "un-configured." Un-configured media device "B" may include registers, circuitry, data, program code, memory addresses, or the like that may be used to determine that the media device is un-configured. The un-configured status of media device "B" may be wirelessly broadcast using any of its wireless resources or other systems, such as RF 107 and/or AV 109. At a stage 440, the APP is aware of configured media device "A" presence on the wireless network and detects that media device "A" is presently in a configured state and therefore has a status of "configured." The APP harvests the configuration (CFG) (e.g., CFG 125 of FIG. 2B) from configured media device "A", and at a stage 442 copies (e.g., via a wireless transmission over the wireless network) the CFG to the un-configured media device "B." At a stage 444, previously un-configured media device "B" becomes a configured media device "B" by virtue of having CFG resident in its system (e.g., CFG 125 in DS system 103 in FIG. 1). After media device "B" has been configured, the flow may terminate at a stage 446. In other examples, the APP may obtain the CFG from a location other than the configured media device "A", such as the Internet or the Cloud as depicted in FIG. 2B. Therefore, at the stage 440, the APP may download the CFG from a web site, from Cloud storage, or other locations on the Internet or an intranet for example.

In the examples depicted in FIGS. 2A – 4B, after one of the media devices is configured, additional media devices that are added by the user or are encountered by the user may be configured without the user (e.g., user 201) having to break a BT pairing with one media device and then establishing another BT pairing with a media device the user is adding to his/her media device ecosystem. Existing media devices that are configured (e.g., have CFG 125) may be used to configure a new media device using the wireless systems (e.g., acoustic, optical, RF) of the media devices in the ecosystem. If multiple configured media devices are present in the ecosystem when the user adds a new un-configured media device, configured media devices may be configured to arbitrate among themselves as to which of the configured devices will act to configured the newly added un-configured media device. For example, the existing media device that was configured last in time (e.g., by a date stamp on its CFG 125) may be the one selected to configure the newly added un-configured media device. Alternatively, the existing media device that was configured first in time (e.g., by a date stamp on its CFG 125) may be the

one selected to configure the newly added un-configured media device. The APP 225 on the user device 220 or other, may be configured to make the configuration process as seamless as possible and may only prompt the user 201 that the APP 225 has detected an un-configured media device and query the user 201 as to whether or not the user 201 wants the APP 225 to configure the un-configured media device (e.g., media device 100b). If the user replies "YES", then the APP 225 may handle the configuration process working wirelessly with the configured and un-configured media devices. If the user 201 replies "NO", then the APP 225 may postpone the configuration for a later time when the user 201 is prepared to consummate the configuration of the un-configured media device. In other examples, the user 201 may want configuration of un-configured media devices to be automatic upon detection of the un-configured media device(s). Here the APP and/or configured media devices would automatically act to configure the un-configured media device(s).

APP 225 may be configured (e.g., by the user 201) to automatically configure any newly detected un-configured media devices that are added to the user's 201 ecosystem and the APP 225 may merely inform the user 201 that it is configuring the un-configured media devices and inform the user 201 when configuration is completed, for example. Moreover, in other examples, once a user 201 configures a media device using the APP 225, subsequently added un-configured media devices may be automatically configured by an existing configured media device by each media device recognizing other media devices (e.g., via wireless systems), determining the status (e.g., configured or un-configured) of each media device, and then using the wireless systems (e.g., RF 107, AV 109, I/O 105, OPT 185, PROX 113) of a configured media device to configure the un-configured media device without having to resort to the APP 225 on the user's device 220 to intervene in the configuration process. That is, the configured media devices and the un-configured media devices arbitrate and effectuate the configuring of un-configured media devices without the aid of APP 225 or user device 220. In this scenario, the controller 101 and/or CFG 125 may include instructions for configuring media devices in an ecosystem using one or more systems in the media devices themselves.

In at least some examples, the structures and/or functions of any of the above-described features may be implemented in software, hardware, firmware, circuitry, or in any combination thereof. Note that the structures and constituent elements above, as well as their functionality, may be aggregated with one or more other structures or elements. Alternatively, the elements and their functionality may be subdivided into constituent sub-elements, if any. As software, the

above-described techniques may be implemented using various types of programming or formatting languages, frameworks, scripts, syntax, applications, protocols, objects, or techniques. As hardware and/or firmware, the above-described techniques may be implemented using various types of programming or integrated circuit design languages, including hardware description languages, such as any register transfer language ("RTL") configured to design field-programmable gate arrays ("FPGAs"), application-specific integrated circuits ("ASICs"), or any other type of integrated circuit. According to some embodiments, the term "module" may refer, for example, to an algorithm or a portion thereof, and/or logic implemented in either hardware circuitry or software, or a combination thereof. These may be varied and are not limited to the examples or descriptions provided. Software, firmware, algorithms, executable computer readable code, program instructions for execution on a computer, or the like may be embodied in a non-transitory computer readable medium.

MEDIA DEVICE WITH PROXIMITY DETECTION

Attention is now directed to FIG. 5 where a profile view depicts one example 500 of media device 100 that may include on a top surface 199s of chassis 199, a plurality of control elements 503 – 512 and one or more proximity detection islands (four are depicted) denoted as 520. Media device 100 may include one or more speakers 160, one or more microphones 170, a display 180, a section 550 for other functions such as SEN 195, VID 109, or other, and antenna 124 which may be tunable 129. Each proximity detection island 520 may be configured to detect 597 proximity of one or more persons, such as user 201 as will be described in greater detail below. The layout and position of the elements on chassis 199 of media device 100 are examples only and actual layout and position of any elements will be application specific and/or a matter of design choice, including ergonomic and esthetic considerations. As will be described in greater detail below, detection of presence of user 201 may occur with or without the presence of one or more user devices 202, such as user devices 210 and 220 depicted in FIG. 5. Circuitry and/or software associated with operation of proximity detection islands 520 may work in conjunction with other systems in media device 100 to detect presence of one or more user devices 202, such as RF system 107 detecting RF signals 563 and/or 565 (e.g., via antenna 124) from user devices 210 and 220 or MIC 170 detecting sound, for example. Detection of presence may be signaled by media device 100 in a variety of ways including but not limited to light (e.g., from 520 and/or 503 – 512), sound (e.g., from SPK 160), vibration (e.g., from SPK 160 or other), haptic feedback, tactile feedback, display of information (e.g., DISP 180), RF

transmission (e.g., 126), just to name a few. SPK 160 and DISP 180 may be positioned on a front surface 199f of chassis 199. A bottom surface 199b of chassis 199 may be configured to rest on a surface such as a table, desk, cabinet, or the like. Other elements of media device 100 may be positioned on a rear surface 199r of chassis 199.

Non-limiting examples of control elements 503 – 512 include a plurality of controls 512 (e.g., buttons, switches and/or touch surfaces) that may have functions that are fixed or change based on different scenarios as will be described below, controls 503 and 507 for volume up and volume down, control 509 for muting volume or BT paring, control 506 for initiating or pausing playback of content, control 504 for fast reversing playback or skipping backward one track, and control 508 for fast forwarding playback or skipping forward one track. Some are all of the control elements 504 – 512 may serve multiple rolls based on changing scenarios. For example, for playback of video content or for information displayed on display 180 (e.g., a touch screen), controls 503 and 507 may be used to increase "+" and decrease "-" brightness of display 180. Control 509 may be used to transfer or pick up a phone call or other content on a user device 202, for example. Proximity detection islands 520 and/or control elements 503 – 512 may be backlit (e.g., using LED's or the like) for night or low-light visibility.

Moving on to FIG. 6, a block diagram 600 depicts one example of a proximity detection island 520. Proximity detection island 520 may be implemented using a variety of technologies and circuit topologies and the example depicted in FIG. 6 is just one such non-limiting example and the present application is not limited to the arrangement of elements depicted in FIG. 6. One or more proximity detection islands 520 may be positioned on, connected with, carried by or otherwise mounted on media device 100. For example, proximity detection island 520 may be mounted on a top surface 199t of chassis 199. A structure 650 made from an optically transmissive material such as glass, plastic, a film, an optically transparent or translucent material, or the like. Structure 650 may be made from a material that allows light 603, 607, 617, and 630 to pass through it in both directions, that is, bi-directionally. Structure 650 may include apertures 652 defined by regions 651 (e.g., an opaque or optically reflective/absorptive material) used for providing optical access (e.g., via apertures 652) to an environment ENV 198 external to the media device 100 for components of the proximity detection island 520. Structure 650 may be configured to mount flush with top surface 199t, for example. In some examples, structure 650 may not include regions 651.

Proximity detection island 520 may include at least one LED 601 (e.g., an infrared LED – IR LED) electrically coupled with driver circuitry 610 and configured to emit IR radiation 603, at least one IR optical detector 605 (e.g., a PIN diode) electrically coupled with an analog-to-digital converter ADC 612 and configured to generate a signal in response to IR radiation 607 incident on detector 605, and at least one indicator light 616 electrically coupled with driver circuitry 614 and configured to generate colored light 617. As depicted, indicator light 616 comprises a RGB LED configured to emit light 617 in a gambit of colors indicative of status as will be described below. Here, RGB LED 616 may include four terminals, one of which coupled with circuit ground, a red "R" terminal, a green "G" terminal, and a blue "B" terminal, all of which are electrically connected with appropriate circuitry in driver 614 and with die within RGB LED 616 to effectuate generation of various colors of light in response to signals from driver 614. For example, RGB LED 616 may include semiconductor die for LED's that generate red, green, and blue light that are electrically coupled with ground and the R, G, and B terminals, respectively. One skilled in the art will appreciate that element 616 may be replaced by discrete LED's (e.g., separate red, green, white, and blue LED's) or a single non-RGB LED or other light emitting device may be used for 616. The various colors may be associated with different users who approach and are detected in proximity of the media device and/or different user devices that are detected by the media device. Therefore, if there are four users/and our user devices detected, then: the color blue may be associated with user #1; yellow with user #2; green with user #3; and red with user #4. Some users and or user devices may be indicated using alternating colors of light such as switching/flashing between red and green, blue and yellow, blue and green, etc. In other examples other types of LED's may be combined with RGB LED 616, such as a white LED, for example, to increase the number of color combinations possible.

Optionally, proximity detection island 520 may include at least one light sensor for sensing ambient light conditions in the ENV 198, such as ambient light sensor ALS 618. ALS 618 may be electrically coupled with circuitry CKT 620 configured to process signals from ALS 618, such as optical sensor 609 (e.g., a PIN diode) in response to ambient light 630 incident on optical sensor 609. Signals from CKT 620 may be further processed by ADC 622. The various drivers, circuitry, and ADC's of proximity detection island 520 may be electrically coupled with a controller (e.g., a μC, a μP, an ASIC, or controller 101 of FIG. 1) that is electrically coupled with a bus 645 (e.g., bus 110 of FIG. 1) that communicates signals between proximity detection island 520 and other systems of media device 100. Proximity detection island 520 may include

auditory system AUD 624 configured to generate sound or produce vibrations in response to presence detection or other signals. AUD 624 may be mechanically coupled 641 with chassis 199 to cause chassis 199 to vibrate or make sound in response to presence detection or other signals. In some examples AUD 624 may use SPK 160 to generate sound or vibration. In other examples AUD 624 may use a vibration motor, such as the type used in smartphones to cause vibration when a phone call or notification is received. In yet another example, AUD 624 may use a piezoelectric film that deforms in response to an AC or DC signal applied to the film, the deformation generating sound and/or vibration. In yet other examples, AUD 624 may be connected with or mechanically coupled with one or more of the control elements and/or one or more of the proximity detection islands 520 depicted in FIG. 5 to provide haptic and/or tactile feedback. Upon detecting and acknowledging an approach by a user and/or user device, media may generate sound (e.g., from SPK 160) in a rich variety of tones and volume levels to convey information and/or media device status to the user. For example, a tone and volume level may be used to indicate the power status of the media device 100, such as available charge in BAT 135 of power system 111. The volume of the tone may be louder when BAT 135 is fully charged and lower for reduced levels of charge in BAT 135. Other tones and volume levels may be used to indicate the media device 100 is ready to receive input from the user or user device, the media device 100 is in wireless communications with a WiFi router or network, cellular service, broadband service, ad hoc WiFi network, other BT enabled devices, for example.

Proximity detection island 520 may be configured to detect presence of a user 201 (or other person) that enters 671 an environment 198 the media device 100 is positioned in. Here, entry 671 by user 201 may include a hand 601h or other portion of the user 201 body passing within optical detection range of proximity detection island 520, such as hand 601h passing over 672 the proximity detection island 520, for example. IR radiation 603 from IRLED 603 exiting through portal 652 reflects off hand 601h and the reflected IR radiation 607 enters portal 652 and is incident on IR detector 605 causing a signal to be generated by ADC 612, the signal being indicative of presence being detected. RGB LED 616 may be used to generate one or more colors of light that indicate to user 201 that the user's presence has been detected and the media device is ready to take some action based on that detection. The action taken will be application specific and may depend on actions the user 201 programmed into CFG 125 using APP 225, for example. The action taken and/or the colors emitted by RGB LED 616 may depend on the

presence and/or detection of a user device 210 in conjunction with or instead of detection of presence of user 201 (e.g., RF 565 from device 210 by RF 107).

As described above, proximity detection island 520 may optionally include ambient light sensor ALS 618 configured to detect ambient light 630 present in ENV 198 such as a variety of ambient light sources including but not limited to natural light sources such as sunny ambient 631, partially cloudy ambient 633, inclement weather ambient 634, cloudy ambient 635, and night ambient 636, and artificial light ambient 632 (e.g., electronic light sources). ALS 618 may work in conjunction with IRLED 610 and/or IR detector 605 to compensate for or reduce errors in presence detection that are impacted by ambient light 630, such as IR background noise caused by IR radiation from 632 or 631, for example. IR background noise may reduce a signal-to-noise ratio of IR detector 605 and cause false presence detection signals to be generated by ADC 612.

ALS 618 may be used to detect low ambient light 630 condition such as moonlight from 636 or a darkened room (e.g., light 632 is off) , and generate a signal consistent with the low ambient light 630 condition that is used to control operation of proximity detection island 520 and/or other systems in media device 100. As one example, if user approaches 671 proximity detection island 520 in low light or no light conditions as signaled by ALS 618, RGB LED 616 may emit light 617 at a reduced intensity to prevent the user 201 from being startled or blinded by the light 617. Further, under low light or no light conditions AUD 624 may be reduced in volume or vibration magnitude or may be muted. Additionally, audible notifications (e.g., speech or music from SPK 160) from media device 100 may be reduced in volume or muted under low light or no light conditions (see FIG. 9).

Structure 650 may be electrically coupled 681 with capacitive touch circuitry 680 such that structure 650 is operative as a capacitive touch switch that generates a signal when a user (e.g., hand 601h) touches a portion of structure 650. Capacitive touch circuitry 680 may communicate 682 a signal to other systems in media device 100 (e.g., I/O 105) that process the signal to determine that the structure 650 has been touched and initiate an action based on the signal. A user's touch of structure 650 may trigger driver 614 to activate RGB LED 616 to emit light 617 to acknowledge the touch has been received and processed by media device 100.

Reference is now made to FIG. 7, where top plan views of different examples of proximity detection island 520 configurations are depicted. Although the various example configurations and shapes are depicted as positioned on top surface 199t of chassis 199, the

present application is not so limited and proximity detection islands 520 may be positioned on other surfaces/portions of media device 100 and may have shapes different than that depicted. Furthermore, media device 100 may include more or fewer proximity detection islands 520 than depicted in FIG. 7 and the proximity detection islands 520 need not be symmetrically positioned relative to one another. Actual shapes of the proximity detection islands 520 may be application specific and may be based on esthetic considerations. Configuration 702 depicts five rectangular shaped proximity detection islands 520 positioned on top surface 199t with four positioned proximate to four corners of the top surface 199t and one proximately centered on top surface 199t. Configuration 704 depicts three circle shaped proximity detection islands 520 proximately positioned at the left, right, and center of top surface 199t. Configuration 706 depicts four hexagon shaped proximity detection islands 520 proximately positioned at the left, right, and two at the center of top surface 199t. Finally, configuration 708 depicts two triangle shaped proximity detection islands 520 proximately positioned at the left, right of top surface 199t. In some examples there may be a single proximity detection island 520. Proximity detection islands 520 may be configured to operate independently of one another, or in cooperation with one another.

Moving to FIG. 8A, a top plan view of proximity detection island 520 coverage is depicted. Each proximity detection island 520 may be designed to have a coverage pattern configured to detect presence of user 201 when the user 201 or portion of the user body (e.g., hand 801h) enters the coverage pattern. Here, the coverage pattern may be semicircular 810 or circular 830, for example. Semicircular 810 coverage pattern may extend outward a distance R1 (e.g., approximately 1.5 meters) from proximity detection island 520 and may span a distance D1 about a center 871 of proximity detection island 520. Semicircular 810 coverage patterns of the four proximity detection islands 520 may not overlap one another such that there may be a coverage gap X1 and Y1 between the adjacent coverage patterns 810. Entry 825 of hand 801h or entry 820 of user 201 may cause one or more of the proximity detection islands 520 to indicate 840 that a presence has been detected, by emitting a color of light from RGB LED 616, for example. In other examples, the coverage pattern may be circular 830 and cover a 360 degree radius 870 about a center point 871 of proximity detection island 520. Circular 830 coverage pattern 830 may or may not overlap the circular 830 pattern of the other proximity detection islands 520.

FIG. 8C depicts a front view 800b of media device 100 and a coverage pattern 860 that has an angular profile Ω about center point 871. Hand 801h entering 825 into the coverage pattern 860 is detected by proximity detection island 520 and detection of hand 810 triggers light 840 being generate by RGB LED 616 of proximity detection island 520. Detection of hand 810 may also cause information "Info" to be displayed on DISP 180 and/or sound 845 to be generated by SPK 160. In FIG. 8C, a side view 800c of media device 100 is depicted with proximity detection island 520 having angular profile α about center point 871 for a coverage pattern 880. Hand 801h entering 825 into the coverage pattern 880 is detected by proximity detection island 520 and detection of hand 810 triggers light 840 being generate by RGB LED 616 of proximity detection island 520 and AUD 624 generating vibration 847.

Attention is now directed to FIG. 9, where a top plan view 900 of media device 100 depicts four proximity detection islands 520 denoted as 1, 2, 3, and 4. Furthermore, control elements 503 – 512 are depicted on top surface 199t. In the example depicted, hand 901h enters into proximity detection range of at least proximity detection island 1 and triggers generation of light (917 a – d) from one or more of the islands (1, 2, 3, 4) such as light 617 from RGB LED 616 of FIG. 6, for example. Presence detection by proximity detection island 1 may cause a variety of response from media device 100 including but not limited to signaling that presence has been detected using light (917 a – d), generating sound 845 from SPK 160, vibration 847, displaying info 840 on DISP 180, capturing and acting on content C from user device 220, establishing wireless communications 126 with user device 220 or other wireless device (e.g., a wireless router), just to name a few. Presence detection by proximity detection island 1 may cause media device 100 to notify user 901 that his/her presence has been detected and the media device is ready to receive input or some other action from user 901. Input and/or action from user 901 may comprise user 901 actuating one of the control elements 503 – 512, touching or selecting an icon displayed on DISP 180, issuing a verbal command or speech detected by MIC 170.

As one example, upon detecting presence of user 901, media device 100 may emit light 917c from proximity detection island 3. If the user device 220 is present and also detected by media device 100 (e.g., via RF signals 126 and/or 563), then the media device 100 may indicate that presence of the user device 220 is detected and may take one or more actions based on detecting presence of the user device 220. If user device 220 is one that is recognized by media device 100, then light 917c from proximity detection island 3 may be emitted with a specific

color assigned to the user device 220, such as green for example. Recognition of user device 220 may occur due to the user device 220 having been previously BT paired with media device 100, user device 220 having a wireless identifier such as a MAC address or SSID stored in or pre-registered in media device 100 or in a wireless network (e.g., a wireless router) the media device 100 and user device 220 are in wireless communications with, for example. DISP 180 may display info 840 consistent with recognition of user device 220 and may display via a GUI or the like, icons or menu selections for the user 201 to choose from, such as an icon to offer the user 201 a choice to transfer content C from user device 220 to the media device 100, to switch from BT wireless communication to WiFi wireless communication, for example. As one example, if content C comprises a telephone conversation, the media device 100 through instructions or the like in CFG 125 may automatically transfer the phone conversation from user device 220 to the media device 100 such that MIC 170 and SPK 160 are enabled so that media device 100 serves as a speaker phone or conference call phone and media device 100 handles the content C of the phone call. If the transfer of content C is not automatic, CFG 125 or other programming of media device 100 may operate to offer the user 201 the option of transferring the content C by displaying the offer on DISP 180 or via one of the control elements 503 – 512. For example, control element 509 may blink (e.g., via backlight) to indicate to user 201 that actuating control element 509 will cause content C to be transferred from user device 220 to media device 100.

In some examples, control elements 503 – 512 may correspond to menu selections displayed on DISP 180 and/or a display on the user device 220. For example, control elements 512 may correspond to six icons on DISP 180 (see 512' in FIG. 8) and user 201 may actuate one of the control elements 512 to initiate whatever action is associated with the corresponding icon on DISP 180, such as selecting a playlist for media to be played back on media device 100. Or the user 201 may select one of the icons 512' on DISP 180 to effectuate the action.

As one example, if content C comprises an alarm, task, or calendar event the user 201 has set in the user device 220, that content C may be automatically transferred or transferred by user action using DISP 180 or control elements 503 – 512, to media device 100. Therefore, a wake up alarm set on user device 220 may actually be implemented on the media device 100 after the transfer, even if the user device 220 is powered down at the time the alarm is set to go off. When the user device is powered up, any alarm, task, or calendar event that has not been processed by the media device 100 may be transferred back to the user device 220 or updated on the user device so that still pending alarm, task, or calendar events may be processed by the user device

when it is not in proximity of the media device 100 (e.g., when user 201 leaves for a business trip). CFG 125 and APP 225 as described above may be used to implement and control content C handling between media device 100 and user devices.

Some or all of the control elements 503 – 512 may be implemented as capacitive touch switches. Furthermore, some or all of the control elements 503 – 512 may be backlit (e.g., using LED's, light pipes, etc.). For example, control elements 512 may be implemented as capacitive touch switches and they may optionally be backlit. In some examples, after presence is detected by one or more of the proximity detection islands (1, 2, 3, 4), one or more of the control elements 503 – 512 may be backlit or have its back light blink or otherwise indicate to user 201 that some action is to be taken by the user 201, such as actuating (e.g., touching) one or more of the backlit and/or blinking control elements 512. In some examples, proximity detection islands (1, 2, 3, 4) may be configured to serve as capacitive touch switches or another type of switch, such that pressing, touching, or otherwise actuating one or more of the proximity detection islands (1, 2, 3, 4) results in some action being taken by media device 100.

In FIG. 9, actions taken by media device 100 subsequent to detecting presence via proximity detection islands (1, 2, 3, 4) and/or other systems such as RF 107, SEN 195, MIC 170, may be determined in part on ambient light conditions as sensed by ALS 618 in proximity detection islands (1, 2, 3, 4). As one example, if ambient light 630 is bright (e.g., 631 or 632), then brightness of DISP 180 may be increased, light 917a – d from islands may be increased, and volume from SPK 160 may be nominal or increased because the ambient light 630 conditions are consistent with waking hours were light intensity and volume may not be a distraction to user 201. On the other hand, if ambient light 630 is dim or dark (e.g., 636), then brightness of DISP 180 may be decreased, light 917a – d from islands may be decreased, and volume from SPK 160 may be reduced or muted because the ambient light 630 conditions are consistent with non-waking hours were light intensity and volume may be a distraction to or startle user 201. Other media device 100 functions such as volume level, for example, may be determined based on ambient light 630 conditions (e.g., as detected by ALS 618 of island 4). As one example, under bright ambient light 630 conditions, volume VH of SPK 160 may be higher (e.g., more bars); whereas, under low ambient light 630 conditions, volume VL of SPK 160 may be lower (e.g., fewer bars) or may be muted entirely VM. Conditions other than ambient light 630 may cause media device 100 to control volume as depicted in FIG. 9.

FIG. 10 depicts one example of a flow 1000 for presence detection, notification, and media device readiness. At a stage 1002 a query as to whether or not an approach is detected by one or more of the proximity detection islands (e.g., 1, 2, 3, 4) is made. Here, the query may be by controller CNTL 640 or controller 101, for example. If one or more of the proximity detection islands have detected presence, then a YES branch is taken. If no presence is detected by one or more of the proximity detection islands, then a NO branch is taken and the flow 1000 may return to the stage 1002 to wait for one or more of the proximity detection islands to detect a presence. The YES branch takes flow 1000 to a stage 1004 where a notification is executed by the media device 100 using light, sound, or vibration to notify a user that presence has been detected, for example, using one or more colors of light (e.g., from RGB LED's 616) and/or an auditory cue (e.g., from SPK 160, vibration from 847, or from a passive radiator used as one of the SPK 160). At as stage 1006, the media device 100 indicates that it is ready to receive input from a user and/or user device (e.g., user 201 or a user device 220 via RF 107). At a stage 1008 a query is made as to whether or not an input is received from a user. If an input is received from the user and/or user device, then a YES branch is taken to a stage 1010 where the media device 100 takes an appropriate action based on the type of user input received and the flow may terminate after the stage 1010. Appropriate actions taken by media device 100 will be application dependent and may be determined in whole or in part by APP 225, CFG 125, executable program code, hardware, etc. Inputs from the user includes but is not limited to actuation of one or more of the control elements 503 – 512, touching an icon or other area of DISP 180, issuing a spoken command or speech detected by MIC 170, taking an action on user device 220 that is wirelessly communicated to media device 100, just to name a few. If no input is received from the user and/or user device, then a NO branch is taken and the flow 1000 may continue at a stage 1012 where flow 1000 may enter into a wait period of predetermined time (e.g., of approximately 15 seconds or one minute, etc.). If a user input is received before the wait period is over, then a NO branch may be taken to the stage 1010. If the wait period is over, then a YES branch may be taken and flow 1000 may resume at the stage 1002.

FIG. 11 depicts another example of a flow 1100 for presence detection, notification, and media device readiness. At a stage 1102 a query as to whether an approach is detected by one or more of the proximity detection islands (e.g., 1, 2, 3, 4) is made. If one or more of the proximity detection islands have detected presence, then a YES branch is taken. If no presence is detected by one or more of the proximity detection islands, then a NO branch is taken and the

flow 1100 may return to the stage 1102 to wait for one or more of the proximity detection islands to detect a presence. The YES branch takes flow 1100 to a stage 1104 where a query is made as to whether or not ambient light (e.g., ambient light 630 as detected by ALS 618 of FIG. 6) is a factor to be taken into consideration in the media devices response to having detected a presence at the stage 1102. If ambient light is not a factor, then a NO branch is taken and the flow 1100 continues to a stage 1106. If ambient light is a factor, then a YES branch is taken and flow 1100 continues at a stage 1108 where any notification by media device 100 in response to detecting presence at the stage 1102 is modified. One or more of light, sound, or vibration may be used by media device 100 to indicate to a user that its presence has been detected. The light, sound, or vibration are altered to comport with the ambient light conditions, such as described above in regard to ambient light 630 in FIG. 9, for example. At the stage 1106, notification of presence being detected occurs using one or more of light, sound, or vibration without modification. At a stage 1110, the media device 100 indicates that it is ready to receive input from a user and/or user device (e.g., user 201 or a user device 220 via RF 107). At a stage 1112 a query is made as to whether or not an input is received from a user. If an input is received from the user and/or user device, then a YES branch is taken to a stage 1114 where the media device 100 takes an appropriate action based on the type of user input received and the flow may terminate after the stage 1114. If no input is received from the user and/or user device, then a NO branch is taken and the flow 1110 may continue at a stage 1116 where flow 1100 may enter into a wait period of predetermined time (e.g., of approximately 15 seconds or one minute, etc.). If a user input is received before the wait period is over, then a NO branch may be taken to the stage 1114. If the wait period is over, then a YES branch may be taken and flow 1100 may resume at the stage 1102. Actions taken at the stage 1114 may include those described above in reference to FIG. 10.

FIG. 12 depicts yet another example of a flow 1200 for presence detection, notification, and media device readiness. At a stage 1202 a query as to whether an approach is detected by one or more of the proximity detection islands (e.g., 1, 2, 3, 4) is made. If one or more of the proximity detection islands have detected presence, then a YES branch is taken. If no presence is detected by one or more of the proximity detection islands, then a NO branch is taken and the flow 1200 may return to the stage 1202 to wait for one or more of the proximity detection islands to detect a presence. The YES branch takes flow 1200 to a stage 1204 where a query is made as to whether or not detection of RF (e.g., by RF 107 using antenna 124) is a

factor to be taken into consideration in the media devices response to having detected a presence at the stage 1202. If RF detection is not a factor, then a NO branch is taken and the flow 1200 continues to a stage 1206. If RF detection is a factor, then a YES branch is taken and flow 1200 continues at a stage 1208 where any notification by media device 100 in response to detecting presence at the stage 1202 is modified. One or more of light, sound, or vibration may be used by media device 100 to indicate to a user that its presence has been detected. The light, sound, or vibration are altered to comport with the detection of RF (e.g., from a user device 220), such as described above in regards to user device 220 in FIG. 9, for example. At the stage 1206, notification of presence being detected occurs using one or more of light, sound, or vibration without modification. At a stage 1210, the media device 100 indicates that it is ready to receive input from a user and/or user device (e.g., user 201 or a user device 220 via RF 107). At a stage 1212 a query is made as to whether or not an input is received from a user. If an input is received from the user and/or user device, then a YES branch is taken to a stage 1214 where the media device 100 takes an appropriate action based on the type of user input received and the flow may terminate after the stage 1214. If no input is received from the user and/or user device, then a NO branch is taken and the flow 1200 may continue at a stage 1216 where flow 1200 may enter into a wait period of predetermined time (e.g., of approximately 15 seconds or one minute, etc.). If a user input is received before the wait period is over, then a NO branch may be taken to the stage 1214. If the wait period is over, then a YES branch may be taken and flow 1200 may resume at the stage 1202. Actions taken at the stage 1214 may include those described above in reference to FIGS. 9 and 10.

FIG. 13 depicts one example 1300 of presence detection using proximity detection islands and/or other systems responsive to wireless detection of different users (e.g., hands 1300a – d) and/or different user devices (e.g., 220a – 220d). In FIG. 13 four users denoted by hands 1300a – d and their respective user devices 220a – 220b enter 925 proximity detection range of one or more of the proximity detection islands (1, 2, 3, 4). Although four users and four user devices are depicted, there may be more or fewer than depicted in FIG. 13. Detection of user devices 220a – 220b may be through wireless means such as RF 107 (e.g., via antenna 124/129) and its various transceivers wirelessly communicating 126 or wirelessly detecting RF 563 from those user devices. For example, considering just one of the users and one of the user devices, hand 1300b enters 925 detection range of proximity detection island 2 and is detected 597 by island 2. Island 2 notifies user via light 1317b that his/her presence has been

detected. User device 220b may be carried by the user at the same time or at approximately the same time as the user's presence is detected by island 2. Therefore, RF 107 may detect RF 563, may attempt to wirelessly connect 126, or be in wireless 126 communications with user device 220b. Accordingly, notifications and actions described above in regards to flow 1200 of FIG. 12 may occur in media device 100 in response to detecting presence 597 at or near the same time as detecting RF from a user device. Media device 100 may emit sound 1345, vibrate 847, display information info on DISP 180, generate light 1317a – 1317d, await actuation of one or more of the control elements 503 – 512, or other action(s), for example. At the same time or at different times, other users denoted by hands 1300a, 1300c, and 1300d may be detected 597 by one or more of the proximity detection islands (1, 2, 3, 4) along with RF 563 from user devices 220a, 220c, and 220d being detected by RF 107. Media device 100 may take appropriate action(s) and make appropriate notification(s) as described herein in response to proximity detection and RF detection occurring in close time proximity to one another, simultaneously, nearly simultaneously, or in some sequence. In that a range for RF transmissions may typically be greater than a detection range for the proximity detection islands (1, 2, 3, 4), in some examples the RF signatures or signals of user device 220a – d may be detected by RF 107 before the proximity detection islands (1, 2, 3, 4) detect presence of the users 1300a – d. For example, RF 107 may detect RF 563 before the user device emitting RF 563 is approximately 10 meters or more away from media device 100 (e.g., for BT transmissions) or much more than 10 meters away for other wireless technologies (e.g., for WiFi transmissions). Therefore, in some examples, RF 107 will detect RF signals prior to proximity detection islands (1, 2, 3, 4) detecting presence 597.

Users devices 220a – 220d may be pre-registered or otherwise associated or known by media device 100 (e.g., via CFG 125 or other) and the actions taken and notifications given by the media device 100 may depended on and may be different for each of the user devices 220a – 220d. For example, after detection and notification based on detecting proximity 597 and RF 563 for user device 220a, media device 100 may establish or re-establish BT pairing (e.g., via BT 120 in RF 107) with 220a and content C on 220a (e.g., a phone conversation) may be transferred to media device 100 for handling via SPK 160 and MIC 170. CFG 125 and/or APP 225 on 220a may affect how media device and user device 220a operate post detection.

As another example, post detection 597 & 563 and notification for user device 220d may result in content C (e.g., music from MP3 files) on 220d being played back 1345 on media

device 100. Control elements 503 – 512 may be activated (if not already activated) to play/pause (506), fast forward (508), fast reverse (504), increase volume (503), decrease volume (507), or mute volume (509). Control elements 512 may be used to select among various play lists or other media on user device 220d.

In another example, content C on user device 220c may, post detection and notification, be displayed on DISP 180. For example, a web page that was currently being browsed on 220c may be transferred to media device 100 for viewing and browsing, and a data payload associated with the browsing may also be transferred to media device 100. If content C comprises a video, the display and playback functions of the video may be transferred to media device 100 for playback and control, as well as the data payload for the video.

Content C this is transferred to media device 100 may be transferred back in part or whole to the user devices depicted, when the user is no longer detectable via islands to proximity detection islands (1, 2, 3, 4) or other systems of media device 100, by user command, or by user actuating one of the control elements 503 – 512 or an icon or the like on DISP 180, for example.

FIG. 14 depicts one example 1400 of proximity detection islands associated with specific device functions. Examples of functions that may be assigned to or fixed to a proximity detection island (1, 2, 3, 4) include but are not limited to "Set Up" of media device 100, "BT Paring" between media device 100 and one or more BT equipped devices, "Shut-Off" of media device 100 (e.g., power off or placing media device 100 in a standby mode, a low power consumption mode, or a sleep mode), and "Content" being handled by media device 100, such as the last media filed that was played on, the last buffered channel, the last playlist that was being accessed by, or the last Internet site or stream being handled by media device 100. One or more of proximity detection islands (1, 2, 3, 4) may serve as indicators for the functions associated with them or may serve to actuate those functions by pressing or touching a surface of the island (e.g., as a switch or capacitive touch switch or button, see FIG. 6). For example, a finger of hand 1400h may touch structure 650 of island 2 to activate the "BT Pairing" between the media device 100 and user device 220, the touch activating the capacitive touch function of island 2 (e.g., causing island 2 to serve as a switch). Island 2 may emit light 1417b to acknowledge the touch by hand 1400h. CFG 125 and/or APP 225 may be used to assign and re-assign functions to one or more of the proximity detection islands (1, 2, 3, 4) and the functions assigned and the proximity islands they are assigned to may be user dependent and/or

user device dependent. As another example, pressing or touching island 4 may turn power off to the media device 100, or may place media device 100 in a low power, standby, or sleep mode.

In other examples, one or more of the control elements 503 – 512 or an icon or the like on DISP 180 may be actuated or selected by a user in connection with one of the functions assigned to proximity detection islands (1, 2, 3, 4). For example, to activate the "BT Pairing" function of island 2, control element 512 that is nearest 1427 to island 2 may be actuated by the user. In another example, proximity detection islands (1, 2, 3, 4) may be associated with different users whose presence has been detected by one or more of the islands. For example, if proximity of four users (U1, U2, U3, U4) has been detected by any of the islands, then U1 may be associated with 4, U2 with 1, U3 with 2, and U4 with 3. Association with an island may be used to provide notifications to the user, such as using light from RGB LED 616 to notify the user of status (e.g., BT pairing status) or other information.

FIG. 15 depicts one example 1500 of content handling from a user device subsequent to proximity detection by islands 520 and/or wireless systems of media device 100. User 1500h is detected 1540 by proximity detection island 520 which emits light 1517, sound 1545, vibration 847, and display of information info on DISP 180 to indicate that media device 100 has detected presence and is ready to receive user input. User device 220 may also have been detected by a transceiver RXTX 1507 in RF 107. RXTX 1507 may represent any transceiver in RF 107 such as BT 120, WiFi 130, AH 140, or other 150. Media device 100, post detection, may be wirelessly connected with user device 220 using a variety of wireless paths such as a direct wireless connection 126 between media device 100 and user device 220, and wireless connections 1565 and 1563 via wireless router 1570, for example. Content C on user device 220 may be handled or otherwise stored or routed to media device from the user device 220 or from Cloud 1550 using a variety of wireless paths. Cloud 1550 may represent the Internet, an intranet, a server farm, a download site, a music store, and application store, Cloud storage, a web site, just to name a few. Information including but not limited to content C, data D, a playlist PL, a stream or streaming service S, and a URL, just to name a few. Although content C is depicted as being presently on user device 220, one or more of the information in Cloud 1550 may also be presently on user device or wirelessly accessible to user device 220 via wireless connections 1561, 1563, 1567, 126, 1569, and 1565. Some of the wireless connections may be made through wireless router 1570 or media device 100 (e.g., via WiFi 130).

In some examples, content C or other information resident or accessible to user device 220 may be handled by media device 100. For example, if C comprises media files such as MP3 files, those files may be wirelessly accessed by media device 100 by copying the files to DS 103 (e.g., in Flash memory 145) thereby taking the data payload and wireless bandwidth from the user device 220 to the media device 100. Media device 100 may use it wireless systems to access 1569 or 1565 and 1567 the information from Cloud 1550 and either store the information locally in DA 103 or wirelessly access the information as it is played back or otherwise consumed or used by media device 100. APP 225 and CFG 125 may include information and executable instructions that orchestrate the handling of content between media device 100, user device 220, and Cloud 1550. For example, a playlist PL on user device 220 may be located in Cloud 1550 and media files associated with music/videos in the PL may be found at URL in Cloud 1550. Media device 100 may access the media files from the location specified by the URL and wirelessly stream the media files, or media device may copy a portion of those media files to DS 103 and then playback those files from its own memory (e.g., Flash 145).

In other examples, user 1500h may be one of many users who have content to be accessed and/or handled by media device 100. Post detection, songs, play lists, content, of other information on user device 220 or from Cloud 1550 may be placed in a queue with other information of similar type. The queue for songs may comprise Song 1 through Song N and songs on user device 220 that were active at the time of proximity detection may be placed in some order within the queue, such as Song 4 for being fourth in line in queue for playback on media device 100. Other information such as play lists PL 1 – PL N or other content such as C 1 – C N may be placed in a queue for subsequent action to be taken on the information once it has moved to the top of the queue. In some examples, the information on user device 220 or from Cloud 1550 may be buffered in media device 100 by storing buffered data in DS 103.

FIG. 16 depicts another example of content handling from user devices subsequent to proximity detection. In FIG. 16, a plurality of users 1601a – 1601n and their associated user device 220 are detected by media device 100 are queued into DS 103 on media device 100 for handling or are buffered BUFF into DS 103 in some order. Detection of each user and or user device may be indicated with one or more different colors of light 1517, different sounds 1545, different vibration 847 patterns, or different info on DISP 180. In some examples, buffering BUFF occurs in storage 1635 provided in Cloud 1550. In FIG. 16, users 1601a – 1601n have information on their respective user devices 220 that may be handled by media device 100 such

as Song 1 – Song N, PL 1 – PL N, C 1 – C N. The information from the plurality of users 1601a – 1601n is queue and/or buffered BUFF on media device 100 and/or in Cloud 1550, that is, media device may handle all of the information internally, in Cloud 1550, or some combination of media device 100 and Cloud 1550. For example, if a data storage capacity of the information exceeds a storage capacity of DS 103, then some or all of the data storage may be off loaded to Cloud 1550 (e.g., using Cloud storage or a server farm). Information from users 1601a – 1601n may be played back or otherwise handled by media device 100 in the order in which proximity of the user was detected or in some other order such as a random order or a shuffle play order. For example, DISP 180 may have an icon RDM which may be selected for random playback.

FIG. 17 depicts one example of content handling from a data capable wristband or wristwatch subsequent to proximity detection by a media device. A hand 1700h of a user may comprise a user device in the form of a data capable wristband or wristwatch denoted as 1740. Wristband 1740 may include information " " that is stored in the wristband 1740 and is wirelessly accessible using a variety of wireless connections between media device 100, wireless router 1570, and Cloud 1750. Media device 100 may serve as a wireless hub for wristband 1740 allowing wristband 1740 to send and retrieve information from Cloud 1750 via wireless connections between media device 100 and wireless router 1570 and/or Cloud 1750. For example, wristband 1740 may use BT to wirelessly communicate with media device 100 and media device 100 uses its WiFi 130 to wirelessly communicate with other resources such as Cloud 1750 and router 1570. Detection 1540 of hand 1700h and/or device 1740 may trigger the emission of light 1517, generation of sound 1545, vibration 847, and display of information info on DISP 180.

Information " " included in wristband 1740 may include but is not limited to alarms A, notifications N, content C, data D, and a URL. Upon detection of proximity, any of the information " " may be wirelessly communicated from wristband 1740 to media device 100 where the information " " may be queued (A 1 – A N; D 1 – D N, N1 – N n; and C 1 – C N) and/or buffered BUFF as described above. In some examples, post detection, wristband 1740 may wirelessly retrieve and/or store the information " " from the media device 100, the Cloud 1750, or both. As one example, if wristband 1740 includes one or more alarms A, post detection those alarms A may be handled by media device 100. Therefore, if one of the alarms A is set to go off at 6:00pm and detection occurs at 5:50pm, then that alarm may be handled by media device 100 using one or more of DISP 180, SPK 160, and vibration 847, for example. If another

alarm is set for 5:30am and the wristband 1740 and media device 100 are still in proximity of each another at 5:30am, then the media device 100 may handle the 5:30am alarm as well. The 6:00pm and 5:30am alarms may be queued in the alarms list as one of A 1 – AN. When wristband 1740 and media device 100 are no longer in proximity of each other, any alarms not processed by media device 100 may be processed by wristband 1740.

In FIG. 18, a plurality of users 1801 a – 1801n and their respective wristwatches 1740 are detected by one or more proximity detection islands 520 of media device 100 and/or or other systems such as RF 107. Detection of each user and or device 1740 may be indicated with one or more different colors of light 1517, different sounds 1545, different vibration 847 patterns, or different info on DISP 180. Here, each wristwatch 1740 includes information " " specific to its user and as each of these users and wristwatches come into proximity and are detected, information " " may be queued, buffered BUFF, or otherwise stored or handled by media device 100 or in Cloud 1750. For example, data D may include exercise, nutrition, dietary data, and biometric information collected from or sensed via sensors carried by the wristwatch 1740. Data D may be transferred to media device 100 or Cloud 1750 and accessed via a URL to a web page of a user. The data D may be shared among other users via their web pages. For example, some or all of users 1801a – 1801n may be consent to sharing their information " " through media device 100, Cloud 1750, or both. Users 1801a – 1801n may view each other's information " "on DISP 180 or go to a URL in Cloud 1750 or the like to view each other's information " ". Information " " that is displayer on DISP 180 may be buffered BUFF, queued (A 1 – A N; D 1 – D N, N1 – N n; and C 1 – C N), or otherwise stored on media device 100 (e.g., in DS 103) for each user to query as desired. A non-transitory computer readable medium such as CFG 125 and/or APP 225 may be used to determine actions taken by wristwatch 1740 (e.g., via APP 225) and media device (e.g., via CFG 125).

In FIG. 19, one example of a flow 1900 for content C handling on a media device 100 or other location, post proximity detection includes the media device 100 accessing the content C at a stage 1902. Here, accessing may include negotiating the necessary permissions, user names and passwords, or other tasks necessary to gain access to the content C on a user device or located elsewhere (e.g., in the Cloud, on a website, or on the Internet). Accessing the content C may include wirelessly connecting with the user device or other source of the content C. At a stage 1904 the media device 100 makes a determination is made as to the type of the content C, such as a media file (e.g., music, video, pictures), a web page (e.g., a URL), a file, a document

(e.g., a PDF file), for example. At a stage 1906 the media device 100 makes a determination as to a status of the content C. Examples of status include but are not limited to static content C (e.g., a file) and dynamic content C (e.g., a stream or a file currently being accessed or played back). At a stage 1908 the media device 100 handles the content C based on its type and status from stages 1904 and 1906.

In that there may be many user devices to service post proximity detection or more than one item of content C to be handled from one or more user devices, at a stage 1910 media device 100 queries the user devices to see if there is additional content C to be handled by the media device 100. If additional content exists, then a YES branch may be taken and flow 1900 may return to stage 1902. If no additional content C is to be handled, then a NO branch may be taken and at a stage 1912 a decision to terminate previously handled content C may be made. Here, a user device may have handed over content C handling to media device 100 post proximity detection, but when the user device moves out of RF and/or proximity detection range (e.g., the user leaves with his/her user device in tow), then media device 100 may release or otherwise divorce handling of the content C. If previously handled content C does not require termination, then a NO branch may be taken and flow 1900 may end. On the other hand, if previously handled content C requires termination, then a YES branch may be taken to a stage 1914 were the previously handled content C is released by the media device 100. Release by media device 100 includes but is not limited to wirelessly transferring the content C back to the user device or other location, deleting the content C from memory in the media device 100 or other location, saving, writing or redirecting the content C to a location such as /dev/null or a waste basket/trash can, halting streaming or playback of the content C, storing the content C to a temporary location, just to name a few.

FIG. 20 depicts one example of a flow 2000 for storing, recording, and queuing content C on a media device 100 or other location post proximity detection. After content C has been handled by media device 100 (e.g., stage 1908 of FIG. 19), media device 100 may determine a size (e.g., file size) of the content C at a stage 2002. The size determination may be made in order for the media device 100 to determine if the media device 100 has the memory resources to handle and/or store the content C. If the media device 100 cannot accommodate content C due to size, then media device 100 may select another source for the content C or access the content from the user device or other location where it is stored. At a stage 2004 the media device 100 determines whether or not the content C is dynamic. Examples of dynamic content C include but

are not limited to content C on a user device that is currently being accessed or played back on the user device. The dynamic content C may reside on the user device or may be accessed from another location (e.g., the Cloud or Internet). If the content C is not dynamic (e.g., is static such as file), then a NO branch may be taken to a stage 2010 where the media device 100 selects an appropriate location to store content C based on its size from the stage 2002. Examples of appropriate locations include but are not limited to a user device, the Cloud, the Internet, an intranet, network attached storage (NAS), a server, and DS 103 of media device 100 (e.g., in Flash memory 145). In some examples, media device 100 may include a memory card slot for a SD card, microSD card, Memory Stick, SSD, CF card, or the like, or a USB connector that will accommodate a USB thumb drive or USB hard drive, and those memory devices may comprise an appropriate location to store content C. At a stage 2012 the content C is stored to the selected location. If the content C is dynamic, then a YES branch may be taken to a stage 2006 where memory device 100 selects an appropriate location to record the dynamic content C to based on the size of the content C. Appropriate locations include but are not limited to those described above for the stage 2010. At a stage 2008 the media device 100 records the dynamic content to the selected location. The selected location may be a buffer such as BUFF described above. At a stage 2014 a determination may be made as to whether or not the recording is complete. If the recording is not complete, then a NO branch may be taken and flow 2000 may return to the stage 2008. If the recording is complete, then a YES branch may be taken to a stage 2016 where a decision to queue the content C is made. If the content C is not to be queued, then a NO branch may be taken and the flow 2000 may end. If the content C is to be queued then a YES branch may be taken and at a stage 2018 the recorded content C or stored content C (e.g., from stage 2012) is queued. Queuing may occur as described above in reference to FIGS. 15 – 18. Media device 100 may maintain the queue in memory, but the actual content C need not be stored internally in memory device 100 and may be located at some other location such as the Cloud or a user device, for example.

At the stage 2008, the media device 100 may playback other content C (e.g., an mp3 or mpeg file) while recording the content C to the selected location. For example, if three users (U1 – U3) approach media device 100 with their respective user devices, are detected by one or more of the proximity detection islands (e.g., 1, 2, 3, 4) and/or by RF 107, then post detection, media device 100 may begin to handle the content C from the various user devices as described in reference to FIGS. 19 and 20. However, assume for purposes of explanation, that users U1

and U3 have static content C to be handled by media device 100 and user U2 has dynamic content C. Furthermore, assume that queuing of the content C may not be in the order in which media device 100 detected the user devices, and that order is U2, U3, U1. Now, per flows 1900 and 2000, media device 100 begins to record and store the dynamic content C from U2 (e.g., U2 was streaming video); however, the recording is not complete and media device 100 handles the content C from U1 next, followed by the content C of U3. Content C from U1 comprises a playlist for songs stored in the Cloud and C from U3 comprises alarms A, notifications N, and data D from a data capable wristband/wristwatch. Media device 100 handles and stores the content C from U3 in its internal memory (e.g., DS 103) and queues U3 content first for display, playback, or other on media device 100. Media device 100 accesses the songs from U1's playlist from the Cloud and queues U1 next in the queue behind U3 for playback on the SPK 160 of media device 100. Finally, the recording is complete on U2's dynamic content C and the video stream is recorded on NAS and media device 100 has accesses to the NAS via WiFi 130. U2 is queued behind U1 for playback using DISP 180 and SPK 160 of media device 100. In some examples, where there are not conflicts in handling content C, the media device may display U3's content C on DISP 180 while playing back U1's mp3 songs over SPK 160, even thou U1 is behind U3 in the queue. Here, there is no or minimal conflict in handling content C because U1's content is primarily played back using the media device's 100 audio systems (e.g., SPK 160) and U3's content C is primarily visual and is displayed using the media device's 100 video systems (e.g., DISP 180). Servicing content C from U3 and U1 at the same time may mean temporarily bumping visual display of U1's playlist on DISP 180 to display U3's content C.

Moving now to FIG. 21 where one example 2100 of a media device 100 handling, storing, queuing, and taking action on content from a plurality of user devices is depicted. In FIG. 21, four users denoted by hands 2100a – d move within proximity detection range of islands 520, are detected 2140, and the users are notified 2117 of the detection, as described above. The four users 2100a – d each have their respective user devices UD1 – UD4 having content C1 – C4. For purposes of explanation, assume the order in which the user devices are discovered by the media device (e.g., via RF 107) is UD2; UD4; UD3; and UD1 and the content C on those devices are queued in the same order as the detection as denoted by C2; C4; C3; and C1 in diagram 2180. The media device 100, the user devices UD1 – UD4, wireless router 2170, and Cloud 2150 are all able to wirelessly communicate with one another as denoted by 2167.

C2 comprises a playlist and songs, is static, and each song is stored in a mp3 file in memory internal to UD2. As per the flows 1900 and 2000, media device queues C2 first and stores C2 in a SDHC card 2121 such that the playlist and mp3 files now reside in SDHC 2121. C1 and C4 both comprise information stored in a data capable wristband/wristwatch. C1 and C4 are static content. Media device queues C4 behind C2, and stores C4 in Cloud 2150. C3 comprises dynamic content in the form of an audio book being played back on UD3 at the time it was detected by media device 100. C3 is queued behind C4 and is recorded on NAS 2122 for later playback on media device 100. C1 is queued behind C3 and is stored in Cloud 2150.

However, the queuing order need not be the order in which content C is played back or otherwise acted on by media device 100. In diagram 2180, media device has ordered action to be taken on the queued content in the order of C1 and C4 first, C2 second and C3 third. C3 may be third in order because it may still be recording to NAS 2122. The information comprising C1 and C4 may be quickly displayed on DISP 180 for its respective users to review. Furthermore, the size of data represented by C1 and C4 may be much smaller than that of C2 and C3. Therefore, while C3 is recording to NAS 2122 and C2 is being copied from UD2 into SDHC 2121, action is taken to display C1 and C4 on DISP 180. Action is then taken on C2 and a portion of the playlist from C2 is displayed on DISP 180 with the song currently being played highlighted in that list of songs. The music for the song currently being played is output on SPK 160. Finally, the recording of C3 is completed and DISP 180 displays the title, author, current chapter, and publisher of the audio book. Action on C3 may be put on hold pending C2 completing playback of the songs stored in SDHC 2121.

Here, media device 100 handled the various types of content C and operated on one type of content (recording C3) while other content (C1 & C4, C2) were being acted on, such as displaying C1 and C4 or playback of mp3 files from C2. In FIG. 21, if UD2 moves 2133 out of RF range of media device 100, C2 may be released from the queue and action on C2 may stop and the next item of content in the queue is acted on (e.g., C3). FIG. 21 is a non-limiting example and nothing precludes one of the users taking action to change the queuing order or the order in which the media device acts on queued content. Moreover, CFG 125 and/or APP 225 may be used to determine content queuing and an order in which queued content is acted on by media device 100. One of the users may have super user capability (e.g., via that user's APP 225 and/or CFG 125) that allows the super user to override or otherwise control content handling on media device 100.

FIG. 22 depicts another example 2200 of a media device handling, storing, queuing, and taking action on content from a plurality of user devices. Here, a plurality of users 2200a – 2200n have approached media device 100 and have be detected by a proximity island 520. A plurality of user devices UDa – UDn, having content Ca – Cn, are in wireless communications 2167 as described above. In diagram 2280, the content Ca – Cn from the user devices is queued in the order the user devices were detected by media device 100. Content Ca – Cn may be stored and/or accessed by media device 100 from any location that may be directly accessed or wirelessly accessed by media device 100 such as in DS 103 (directly accessed), NAS 2122, the user devices UDa – UDn, the Cloud 2250, etc.

Media device 100 may take action on the queued content in any order including but not limited to random order, the order in which it is queued, or commanded order, just to name a few. Media device 100 may be configured to operate in a "party mode" where each of the users 2200a – 2200n in proximity of the media device 100 desires to have their content played back on the media device 100. Media device 100 may harvest all of the content and then act on it by randomly playing back content from Ca – Cn, allowing one of the users to control playback, like a DJ, or allowing a super user UDM to control playback order and content out of Ca – Cn. One of the users may touch or otherwise actuate one of the control elements 503 – 512 and/or one of the proximity detector islands 520 or an icon on DISP 180 to have their content acted on by media device 100. Content in Ca – Cn may be released by media device 100 if the user device associated with that content moves out of RF range of the media device 100.

In FIG. 23, a flow 2300 for recording user content on a media device while the media device handles current content is depicted. At a stage 2302 entry of a user (e.g., hand of a user) into detection range of a proximity detection island 520 of media device 100 is detected. At a stage 2304 the user is notified that media device 100 has detected the user's presence (e.g., using light, sound, vibration, etc.). At a stage 2306, media device 100 may use RF system 107 to detect RF signals being transmitted by a user device (e.g., 220) as described above. At a stage 2308, the media device 100 and the user device wirelessly connect with each other (e.g., using WiFi 130 or BT 120). At a stage 2310 content currently being handled by media device 100 (e.g., being played back or queued for playback) is displayed on the media device 100 (e.g., DISP 180) or on a display of the user device, or both, for example. APP 225 or other software and/or hardware may be used to display the current content being handled on media device 100 on the user device. At as stage 2312, a request from the user device to the media device 100 for

the media device 100 to handle user content from the user device is received. At a stage 2314, the media device 100 harvests the user content from the user device (e.g., wirelessly copies, streams, or otherwise accesses the user content). The user content may reside on the user device or may be located elsewhere at a location the media device 100 or user device may access, such as the Cloud, the Internet, an intranet, NAS, or other, for example. At a stage 2316 the media device 100 begins recording the user content while continuing playback of the content currently being handled by the media device 100. As was described above in reference to FIG. 22, the media device 100, based on a size of the user content (e.g., file size in MB or GB) may record the user content to memory internal to the media device 100 or to a location external to the media device 100 (e.g., NAS, the Cloud, a server, the Internet). Content that was being handled by the media device 100 continues with little or no interruption while the user content is recorded. At a stage 2318 the user content is stored as described above and flow 2300 may terminate at the stage 2318. Optionally, at a stage 2320, a determination may be made to queue the user content relative to the current content being handled by the media device 100. If no queuing action is to be taken, then a NO branch may be taken and the flow 2300 may terminate. However, if the user content is to be queued, then a YES branch may be taken to a stage 2322 where a queuing action is applied to the user content. Queuing action may mean any action taken by the media device 100 (e.g., via controller 101, CFG 125, hardware, or software) and/or user device (e.g., via APP 225) that affects the queuing of content on the media device 100.

Queuing action may include but is not limited: to waiting for the user content to complete recording and then placing the user content in a queuing order relative to other content already queued on the media device 100 (e.g., at the back of the queue); bumping content presently at the front of the queue once the user content has completed recording and beginning playback of the recorded user content; placing the user content behind the content currently being handled by the media device 100 such that the user content will be next in line for playback; moving the user content to the front of the queue; randomly placing the user content in the queue; allowing the user of the user device to control the queuing of the user content; allowing a DJ or other user to control the queuing of the user content; and allowing each user that is detected by the proximity detection islands, have one or more items in their content harvested and pushed to the top of the queue or placed next in line in the queue; and placing the user content in a queue deck with other content, shuffling the deck and playing on of the items of content from the deck, and re-shuffling the deck after playback of item; just to name a few.

Content, including the user content that was recorded may be queued in a party mode where each user who wants their content played back on the media device 100, approaches the media device 100, is detected by the proximity detection islands, receives notification of detection, has at least one selected item of user content harvested by the media device 100, and has the item of user content played back either immediately or after the current content being played back finishes. In some examples, the queue for content playback on media device 100 is only two items of content deep and comprises the current piece of content being played back and the user content of the user who approached the media device 100 and had their content harvested as described above.

Now referencing FIG. 24, one example 2400 of queuing action for user content in a queue of a media player is depicted. In example 2400 there are at least seven users U1 – U7 and at least seven user devices UD1 – UD7. For purposes of simplifying the description, assume that all seven users have approached media device 100, have been detected 2140 and notified 2117 by proximity island 520, and all user devices have been detected and wirelessly connected with media device 100. Here user content C1, C2, and C3 has been queued in queue 2480 and DISP 180 is displaying the queued order of the playlist as Song for UD1 currently being played back because it is underlined (e.g., over SPK 160), with Songs for UD2 and UD3 being next in the playlist. User content for UD1 – UD3 may reside in DS 103 or other location such as NAS 2122 or Cloud 2250. User devices UD1 – UD3, in that order, were the first three devices to wirelessly connect and have their user content C1 – C3 harvested by media device 100. The Action for the queuing order in queue 2480 is "Play In Order", so C1 is first, C2 is second, and C3 is third in the playback order as displayed on DISP 180. At some point in time, UD7 also wirelessly connected and had its user content C7 harvested by media device 100. Media device 100 begins the process of recording 2490 the content into DS 103 (e.g., into Flash 145). In the meantime, other user devices (not shown) may also have their user content harvested. In that the recording 2490 of C7 is still in progress, intervening user content will be placed ahead of C7 until C7 has completed 2492 recording 2492. Upon completion of recording, C7 is positioned 2482 in the playlist below some already queued user content and ahead or other user content lower in the queue. In other examples, C7 may be queued in the order it was presented to the media device 100 and the media device 100 begins the recording 2490 process and allows C7 to be played back when it moves to the top of queue, but if C7 has not completed recording 2492, then media device 100 begins the playback 2493 of C7 from a buffer BUFF 2421 where a portion of

recorded C7 is stored. The playback from BUFF 2421 may continue until the recording catches up with the buffered content or is completed 2492.

As described above, one of the users or user devices may have super user (e.g., UM) or other form of override authority and that user may order the queue to their liking and control the order of playback of user content. Queue 2480 and/or the user content being queued need not reside in memory internal to media device 100 and may be located externally in NAS 2122, a USB Hard Drive, Cloud 2250, and a server, just to name a few. In some examples, media device 100 may delete or bump user content from queue 2480 if the wireless connection 2167 between media device 100 and the user device is broken or interrupted for a predetermined amount of time, such as two minutes, for example. The "Play In Order" example depicted is a non-limiting example and one skilled in the art will appreciate that the queuing may be ordered in a variety of ways and may be determined by executable program code fixed in a non-transitory medium, such as in DS 103, Flash 145, CFG 125, and APP 225, just to name a few. Therefore, controller 101 or a controller in a user device may execute the program code that determines and controls queuing of user content on the media device 100.

Media Devices For Audio And Video Projection Of Media Presentations

Referring back to FIG. 1, in some examples, media device 100 may include an image projection system 192 (e.g., a video projector, pico projector, or the like) configured to receive one or more video signals and project an image 194 indicative of the one or more video signals to a position external to the chassis 199. Although image projection system 192 is depicted as being included in A/V system 109, the image projection system 192 may be included in another system of media device 100 or may be a stand-alone system of media device 100. A surface such as wall, screen, video projection screen, or other may be positioned external to chassis 199 to receive the image 194 projected by image projection system 192. Chassis 199 may include an opening, portal, shutter, or the like through which an image from the image projection system 192 is projected. Image projection system 192 may include optics configured to allow a user and/or circuitry to control and/or adjust focus, zoom, etc. A user device as described above may be used to control some or all of the operational aspects of the image projection system 192 using a GUI or the like to select one or more sources to be connected with the image projection system 192, to control aspect ratio of the projected image, focus, zoom, light intensity (e.g., brightness), or any other parameters for a video projection system. For example APP 225 and/or CG 125 may be used to effectuate control and/or operation of image projection system 192.

Video signals received by projection system 192 may be analog, digital, or both and may be electrically communicated to media device 100 using a wired connection (e.g., via a connection with Port 118) or wireless via RF system 107 using one or more of its plurality of RF transceivers as described above. Port 118 or other port on media device 100 may include a connection to receive a wired input from a video source including but not limited to a PC, laptop, tablet, smartphone, video capture device, camera, a wired or wireless network, cellular network, just to name a few. As one example, port 118 or other connection on media device 100 may include a HDMI or mini HDMI connection for receiving an HDMI cable from a video source. Other types of hard wired connections and/or interfaces may be included with media device 100 for receiving video and/or audio and video signals including but not limited to HDMI, DVI, VGA, RGB, component video, composite video, S-video, USB, DisplayPort, Thunderbolt, Lightning, Firewire, IEEE 1394, just to name a few.

In some examples, image projection system 192 may include a switch SW 193 configured to allow the image projection system 192 to select and/or switch between multiple video source inputs. For example, the switch SW 193 may select between multiple HDMI inputs and be configured to arbitrate which one or more of the inputs to feed to the image projection system 192. As another example, SW 193 may be configured to auto-detect a video input that goes active (e.g., has relevant video signal activity on it) and automatically switch that input to the image projection system 192 for processing and projecting an image indicative of the signal.

Images or other data projected from image projection system 192 may be sourced from a variety of sources including but not limited to VID 190 (e.g., an image capture device in media device 100), streamed media, WiFi network, Cellular network, LAN, Ethernet, WiMAX network, live video feeds from external sources such as a camcorder, digital camera, video camera, smartphone, tablet, pad, web cam, PC, laptop, netbook, optical disc (e.g., Blu-Ray, CD-ROM, DVD, etc.) security camera, surveillance camera, just to name a few.

Image projection system 192 may include without limitation any video projection technology and that technology may be application dependent. For example, for size, form factor, heat dissipation, cooling requirement, durability, optics size, reliability, and portability, it may be desirable to use one or more solid state light sources, such as red, green, and blue LED's as the light source for image projection system 192. Technologies such as DLP (multiple chip or single chip), LCD, LCoS, OLED, LED, Hybrid-LED and Laser Diode, Holographic, SXRD, D-ILA, Laser Diode, or other, without limitation may be used to implement the Image projection

system 192. An optical system (e.g., lens or lenses) for the Image projection system 192 may include optical elements that are glass, plastic, or some combination thereof and one or more of those elements may be aspheric in shape.

Image projection system 192 may project images in a variety of image resolutions including but not limited to any HD resolution, 4K, and any VGA resolution. Image projection system 192 may include circuitry and/or software or algorithms to convert from one video format to another video format and may include circuitry and/or software or algorithms to up-convert one video format to another video format such as up-converting DVD resolution to Blu-Ray resolution, for example. Image projection system 192 may project images at one or more aspect ratios without limitation. Examples include but are not limited to: 16:9; 1.85:1; 2.39:1; 1.77:1; 4:3; 3:2; 5:3; 1:1; and 5:4.

Spatial Presentations Using Media Devices For Audio And Video Projection Of Media Presentations

Media device 100 may be configured to present media presentations that are perceived by one or more users as being spatially defined in more than two dimensions, such as three dimensions (e.g., 3D) for video, audio, or both. 3D audio and/or video may be from content provided by an external source such as another media device 100, media content from the Cloud, Internet, a network, NAS, a media stream, a storage device or medium (e.g., Flash memory, optical disc, hard disc drive, SSD, etc.), for example. In some examples, image projection system 192 may be configured to project images in two-dimensions (e.g., 2D on a Screen) or in three-dimensions (e.g., 3D on a Screen using 3-D Glasses or in 3D without a Screen and/or Glasses, such as Holographic projection).

Referring back to FIG. 1, A/V system 109 or other system in media device 100 may include at least one pair of binaural microphones denoted as BMIC's 171 and 173. Binaural microphones 171 and 173 may be used to supplant MIC 170 or in place of MIC 170. Binaural microphones 171 and 173 may be positioned in a structure 172 and 174 that simulates one or more of interaural time difference (ITD), head-related transfer function (HRT), or interaural level difference (ILD). Binaural microphones 171 and 173 may be positioned on chassis 199 and/or in structures 172 and 174 at a distance E_S that simulates the spacing between the ears of a human being. Chassis 199 may include structures 172 and 174 formed or otherwise attached to chassis 199 and shaped in the form of a human ear or other shape that will simulate the human ear for purposes of recording sound in a binaural format for subsequent playback in a simulated

3D sound field. In other examples, A/V system 109 or other system in media device 100 may include microphones 171 and 173, but the microphones 171 and 173 are not spaced apart by distance E_S and/or may not include structures 172 and 174. In yet other examples, A/V system 109 or other system in media device 100 may include a plurality of microphones (e.g., MIC 170) and those microphones are used for capturing sound for subsequent playback in a simulated sound field (e.g., a 3D sound field as perceived by a user).

DSP 180 or other processor(s) in media device 100 may be used to apply hardware, software, algorithms, or the like to process signals generated by microphones 171 and 173 and playback processed signals over one or more SPK 160 in the media device 100 or one or more SPK 160 in other media devices 100 to produce a 3D sound field. A 3D sound field and/or images may already be encoded into content of media being handled by media device 100. In that case, A/V system 109 or other system in media device 100 may operate to process the encoded content, decode the content, and present the content to A/V system for playback on SPK's 160 and/or image projection system 192.

In some examples, sound captured by microphones 171 and 173 is recorded by A/V system 109 and stored internally (e.g., in DS 103) or externally (e.g., on the Internet, NAS, the Cloud etc.) and is later retrieved for playback either on the media device 100, another media device 100, or some other device. Similarly, VID 190 may capture still or video images and record those images internally or externally for playback on image projection system 192 of that media device 100, another media device 100, or some other device.

Attention is now directed to FIG. 25 where one example 2500 of a media device for audio and video projection of media presentations is depicted. Here, media device 100 includes binaural microphones 171 and 173, which may or may not be spaced apart the distance E_S, image projection system 192, speaker 160, display 180 and VID 190 (e.g., an image capture device). A user 201 may have a user device 2520 on which content C is being played back or is available for playback on media device 100. Content C may reside on user device 2520 or may be resident on the media device 100 or some other source such as 2550 (e.g., the Cloud, NAS, or Internet). Regardless of the source, external content is wirelessly communicated (2567 or 2563) to media device 100 and audio content present in content C may be played back via SPK's 160 as sound 2545 and video content present in content C may be projected 194 by image projection system 192. Projected image 194 may be presented on structure such as a screen 2560, for example. Sound 2545 may be perceived by user 201 as a multi-dimensional sound field 2547 that

surrounds user 201, such as a 3D sound field (e.g., sound field 2547 appears to the user 201 to surround the head of the user 201). Speakers SPK 160 from other media devices 100 may be used during playback to enhance, make more realistic, etc. the multi-dimensional sound field 2547 perceived by user 201 and/or to create additional surround sound effects or channels (e.g., 2.1, 3.1, 4.1, 5.1, 5.2, 7.1, 7.2, 9.1, 9.2, etc.). In some examples, user device 2520 may have a hard wired connection 2564 (e.g., HDMI or other) with media device 100 over which the content C is communicated to the media device 100.

FIG. 26 depicts another example 2500 of a media device for audio and video projection of media presentations. Here, image projection system 192 projects an image 194' that is perceived by user 201 as a multi-dimensional image (e.g., a 3D image) either without aids or with aid (e.g., using 3D glasses or the like). If aids such as glasses are used, a screen (e.g., screen 2560) may be used to project the image 194' on. Example 2600 may or may not include multi-dimensional sound 2547 as described above. In some examples, content C being projected 194 may also be displayed on DISP 180. In other examples, the content C being projected 194 and/or the sound 2545 being played back may have been recorded (e.g., via 190 and MICs 171, 173 or 170) earlier by media device 100 or another media device 100. In yet other examples, another media device 100 may provide the content C and that content is played back live or recorded for later playback by another media device 100.

In FIGS. 25 – 26, the image projection system 192 is depicted as being positioned on a front surface 199f of media device 100; however, the present application is not so limited to the configuration depicted and the actual position of the image projection system 192 may be application dependent and other positions may be used. Similarly, binaural microphones 171 and 173 are depicted as being positioned on a top surface 199t of media device 100, but the present application is not so limited to the configuration depicted and the actual position of the binaural microphones 171 and 173 may be application dependent and other positions may be used.

In FIG. 27 one example 2700 of structures 172 and 174 for housing binaural microphones 171 and 173 on chassis 199 is depicted. Structures 172 and 174 may be positioned on chassis 199 such that binaural microphones 171 and 173 spaced apart by distance E_S as described above. Structures 172 and 174 need not look like or be formed exactly in the shape of the human ear and may have a shape that differs from that depicted in FIG. 27. Structures 172 and 174 may be

configured to emulate the function of the human ear without looking like a human ear or to have an aesthetic appearance that nonetheless emulates the function of the human ear.

Turning now to FIG. 28 where one example 2800 of an image size of a projected image 194 is depicted. Here, image projection system 192 may be configured to project a maximum image size 194, measured as a diagonal distance 2801 that may be in a range from about 45 inches to about 85 inches. In some examples the diagonal image size 2801 is about 60 inches. Although image 194 is depicted being projected on a screen 2860, the present application is no so limited and other structures and/or surfaces may be used to project the image 194 onto. In other examples, where no screen or other structure is used, the diagonal image size 2801 as perceived by a user (e.g., user 201) may be in a range from about 45 inches to about 85 inches. For example a 3D image 194' projected by image projection system 192 may be perceived by a user as having an effective diagonal image size 2801 of about 60 inches. Actual diagonal image size 2801 may be application dependent and the foregoing are non-limiting examples only.

Media device 100 may receive content from multiple sources that may be processed and displayed by image projection system 192 using a variety of formats such as picture-in-picture or other format. In FIG. 29, image projection system 192 projects 194 images from multiple content sources onto screen 2960 or other structure. Those images are denoted as 194a – 194d. There may be more or fewer images than depicted in FIG. 29. The multiple images can be from a variety of sources such as security or surveillance cameras, content feeds from multiple image capture systems or playback devices (e.g., multiple Blu-Ray players), content from educational or sporting events, just to name a few. A user device or controls on media device 100 may be used to manipulate the images and/or audio (if any) associated with each image 194a – 194d. As one example, user device 2950 (e.g., a data capable wristband) may be worn by a user and motion of the users arm, wrist, or body relative to some reference point, such as X-Y-Z axes may generate signals from a gyroscope and/or accelerometer and those signals are wirelessly transmitted 2951 to media device 100 and used to select and manipulate the content being projected by image projection system 192 and any associated audio content.

The wireless media device 100 with image projection system 192 and/or binaural microphones 171 and 173 may be used in a variety of scenarios in educational, institutional, and healthcare fields, just to name a few. Examples of utility for the media device 100 include but are not limited to: remote learning; remote learning with attention feedback from a user device (e.g., band 2950); aging at home with remote patient monitoring (e.g., using VID 190 and MICS

170 and/or 171 and 173); sharing presentations and live conference calling with 3D audio and/or video (e.g., 3D chat); streaming content from the Cloud, Internet, or other source for movies, music, live performances and sporting events; interactive eMedicine in combination with sensors in the media device 100 and/or user devices (e.g., band 2950) for measuring hear rate, respiration rate, galvanic skin response, CO_2 concentration, etc.; enhancing classroom learning for presentations, experiencing audio and/or video content, virtual classrooms, teleconferencing, art programs (e.g., dance, music, drama), sporting events, physical education, kinesiology, etc.; teaching in professional institutions such as medical/dental schools with 3D images and sound of instruction and live operations, etc.; just to name a few.

In some examples, a plurality of media devices 100, some of which may not be equipped with image projection system 192 and/or binaural microphones 171 and 173 may work collectively in an ecosystem to handle content from a user device, manage playlists for a user, and present content based on characterizing the content on behalf of the user. As one example, if a user is playback a movie on his/her user device and the user and/or device come into proximity of the plurality of media devices 100, those media devices may arbitrate (e.g., via CFG 125 and/or APP 225) how to handle the content. If the movie has a multi-channel soundtrack, the plurality of media devices 100 may use their respective speakers SPK 160 to playback the soundtrack in surround sound. One of the plurality of media devices 100 may include the image projection system 192 and that media device 100 will handle playback of the video content of the movie. If the movie is 3D, the image projection system 192 may be configured to playback the content in 3D.

FIG. 30 illustrates an example of a media device configured to facilitate image projection of images with or without three-dimensional ("3D") audio space generation and/or reproduction, according to some embodiments. Diagram 3000 depicts a media device 3002 configured to receive image data (e.g., video, static imagery, etc.) audio data (e.g., from a remote source of audio) for presentation to listeners 3040a to 3040c as spatial audio. In some examples, at least two transducers operating as loudspeakers can generate acoustic signals that can form an impression or a perception at a listener's ears that sounds are coming from audio sources disposed anywhere in a space (e.g., 2D or 3D space) rather than just from the positions of the loudspeakers. Further, media device 3002 can be configured to transmit data representing the acoustic effects associated with sound field 3080. According to various embodiments, sound field 3080 can be reproduced so a remote listener, such as in a video teleconference, can perceive

the positions of listeners 3040a to 3040c relative, for example, to an audio presentation device at the remote location.

Diagram 3000 illustrates a media device 3002 configured to at least include one or more microphones 3010 (e.g., to form one or more binaural microphones), one or more transducers 3020, a controller 3070, a position determinator 3074, a digital image projector 3076 and various other components (not shown), such as a communications module for communicating, Wi-Fi signals, Bluetooth® signals, or the like. Media device 3002 is configured to generate an image 3004, such as a video of remote participants in a teleconference, that can be associated with the audio received by listeners 3040a to 3040c. Further, media device 3002 also is configured to receive audio via microphones 3010 and to produce audio signals and waveforms to produce sound that can be perceived by one or more listeners 3040. As shown in diagram 3000, controller 3070 includes a spatial audio generator 3072. In various embodiments, spatial audio generator 3072 is configured to generate 2D or 3D spatial audio locally, such as at audio space 3042a, audio space 3042b, and audio space 3042c, and/or reproduce sound field 3080 for presentation to a remote listener 3094 as a reproduced sound field 3080a. Sound field 3080, for example, can include one or more audio spaces 3042a to 3042c as well as any common regional sounds 3077 that can be perceptible as originating at any of audio spaces 3042a to 3042c, or as background noise (e.g., sounds of city traffic that are generally detectable at any of the audio spaces in sound field 3080).

Spatial audio generator 3072 is configured to receive audio, for example, originating from remote listener 3094, to generate 2D or 3D spatial audio 3030a for transmission to listener 3040a. In some embodiments, transducers 3020 can generate a first sound beam 3031 and a second sound beam 3033 for propagation to the left ear and the right ear, respectively, of listener 3040a. Therefore, sound beams 3031 and 3033 are generated to form an audio space 3042a (e.g., a binaural audio space) in which listener 3040a perceives the audio as spatial audio 3030a. According to various embodiments, spatial audio generator 3072 can generate spatial audio 3030a using a subset of spatial audio generation techniques that implement digital signal processors, digital filters, and the like to provide perceptible cues for listener 3040a to correlate spatial audio 3030a with a perceived position at which the audio source originates. In some embodiments, spatial audio generator 3072 is configured to implement a crosstalk cancellation filter (and corresponding filter parameters), or variant thereof, as disclosed in published international patent application WO2012/036912A1, which describes an approach to producing

cross-talk cancellation filters to facilitate three-dimensional binaural audio reproduction. In some examples, spatial audio generator 3072 includes one or more digital processors and/or one or more digital filters configured to implement a BACCH® digital filter, which is an audio technology developed by Princeton University of Princeton, New Jersey.

Transducers 3020 cooperate electrically with other components of media device 3002, including spatial audio generator 3072, to steer or otherwise direct sound beams 3031 and 3033 to a point in space at which listener 3040a resides and/or at which audio space 3042a is to be formed. In some embodiments, transducers 3020a are sufficient to implement a left loudspeaker and a right loudspeaker to direct sound beam 3031 and sound beam 3033, respectively, to listener 3040a. Further, additional transducers 3020b can be implemented along with transducers 3020a to form arrays or groups of any number of transducers operable as loudspeakers, whereby groups of transducers need not be aligned in rows and columns and can be arranged and sized differently, according to some embodiments. Transducers 3020 can be directed by spatial audio generator 3072 to steer or otherwise direct sound beams 3031 to specific position or point in space within sound field 3080 to form an audio space 3042a incident with the location of listener 3040a relative to the location of media device 3002. According to various other examples, media device 3002 and transducers 3020 can be configured to generate spatial audio for any number of audio spaces, such as spatial audio 3030b and 3030c directed to form audio space 3042b and audio space 3042c, respectively, which include listener 3040b and listener 3040c. In some embodiments, spatial audio generator 3072 can be configured to generate spatial audio to be perceived at one or more audio spaces 3042a to 3042c. Also, spatial audio generator 3072 can be configured to generate spatial audio for recipients at a remote location. Note that while listeners 3040a to 3040c are described as such (i.e., listeners), such listeners 3040a to 3040c each can be audio sources, too.

Position determinator 3074 is configured to determine approximate position of one or more listeners 3040 and/or one or more audio spaces 3042. By determining approximate positions of listeners 3040, spatial audio generator 3072 can enhance the auditory experience (e.g., perceived spatial audio) of the listeners by adjusting operation of the one or more crosstalk filters and/or by more accurately steering or directing certain sound beams to the respective listeners. In one implementation, position determinator 3074 uses information describing the approximate positions at which audio spaces 3042 are located within sound field 3080 to determine the relative positions of listeners 3040. According to some embodiments, such

information can be used by generating acoustic probes that are transmitted into sound field 3080 from media device 3002 to determine relative distances and directions of audio sources and other aspects of sound field 3080, including the dimensions of a room and the like. Examples of acoustic probes and other acoustic-based techniques for determining directions and distances of audio spaces are described hereinafter.

In other implementations, position determinator 3074 can use audio received from one or more microphones 3010 to determine approximate positions at which audio spaces 3042 are located within sound field 3080. For example, acoustic energy (e.g., vocalized speech) originating from listener 3040a generally is of greater amplitude received into microphone 3010a, which is at a relatively shorter distance to listener 3040a, rather than, for example, the amplitude and time delays associated with the acoustic energy received at microphone 3010c. Also, data representing vocal patterns (e.g., as "speech fingerprints") can be stored in memory (not shown) to be used to match against those individuals who may be speaking in sound field 3080. An individual whose speech patterns match that of the vocal patterns in memory then can be associated with a certain position or audio space. Thus, individualized audio can be transmitted to that person without others in sound field 3080 hearing the individualized audio. For example, listener 3040b can project audio energy 3035 toward microphone 3010c, which is closer to listener 3040b than other microphones 3010a and 3010b. Audio signal amplitude and/or "time of flight" information can be used to approximate a position for listener 3040b.

In alternate implementations, position determinator 3074 can receive position information regarding the position of a listener (or audio source) wearing a wearable device. The wearable device can be configured to determine a location of the wearer and transmit location data to media device 3002. An example of a suitable wearable device, or a variant thereof, is described in U.S. Patent Application 13/454,040, which was filed on April 23, 2012, which is incorporated herein by reference. Also, media device 3002 can detect various transmissions of electromagnetic waves (e.g., radio frequency ("RF") signals) to determine the relative direction and/or distance of a listener carrying or using a device having a radio, for example, such as a mobile phone. In some cases, the RF signals can be characterized and matched against RF signal signatures (e.g., stored in memory) to identify specific users or listeners (e.g., for purposes of generating individualized audio). In some examples, one or more image capture devices (e.g., configured to capture one or more images in visible light, thermal RF imaging, etc.) can be used to detect listeners 3040a to 3040c for determine a relative position of each listener. In at least

one example, media device 3002 can provide a variable number of preset audio spaces (e.g., at preset directions, or sectors) that can be generated by spatial audio generator 3072. For example, if one listener is selected, transducers 3020 direct one or more pairs of sound beams, such sound beams 3031 and 3033, in a relatively larger audio space in front (e.g., directly in front) of media device, whereas if two listeners are selected, than transducers 3020 direct two (2) sets of sound beams into two sectors (e.g., each spanning approximately 90 degrees). Three listeners, such as shown in diagram 3000, can be selected to generate audio spaces over three (3) sectors (e.g., each spanning approximately 60 degrees). Any number of positions in sound field 3080 can be co-located with audio spaces, whereby spatial audio generator 3072 can form the audio spaces based on position data provided by position determinator 3074.

Diagram 3000 further depicts media device 3002 in communication via one or more networks with a remote audio presentation device (not shown) at a remote region. Controller 3070 can be configured to transmit audio data 3003 from media device 3002 to a remote audio system. In some embodiments, audio data 3003 includes audio as received by one or more microphones 3010 (e.g., to receive binaural audio) and control data that includes information describing how to form a reproduce sound field for presentation at a remote location. The remote audio system can use the control data to reproduce sound field 3080 by generating sound beams for the right ear and left ear of a remote listener. For example, the control data may include parameters to adjust a crosstalk filter, including but not limited to distances from one or more transducers to an approximate point in space in which a listener's ear is disposed, calculated pressure to be sensed at a listener's ear, time delays, filter coefficients, parameters and/or coefficients for one or more transformation matrices, and various other parameters. The remote listener may perceive audio generated by listeners 3040a to 3040c as originating from the positions of audio spaces 3042a to 3042c relative to, for example, a point in space coinciding with the location of the remote audio system. In some cases, the remote audio system can include logic, structures and/or functionality similar to that of spatial audio generator 3072 of media device 3002. But in some cases, the remote audio system need not include a spatial audio generator. As such, spatial audio generator 3072 can generate spatial audio that can be perceived by remote listener 3094 regardless of whether the remote audio system includes a spatial audio generator. In particular, a remote audio system, which can provide binaural audio, can use audio data to produce spatial binaural audio via, for example, sound beams to a remote listener without a spatial audio generator, according to some embodiments.

Further, media device 3002 can be configured to receive audio data 3001 via a network from a remote audio system. Similar to audio data 3003, spatial audio generator 3072 of media device 3002 can generate spatial audio 3030a to 3030c by receiving audio from remote audio system 3090 and applying control data to reproduce the sound field associated with the remote listener 3094 for listeners 3040a to 3040c. A spatial audio generator (not shown) disposed in remote audio system 3090 can generate the control data, which is transmitted as part of audio data 3001. In some cases, the spatial audio generator disposed in remote audio system 3090 can generate the spatial audio to be presented to listeners 3040a to 3040c regardless of whether media device 3002 includes spatial audio generator 3072. That is, the spatial audio generator disposed in remote audio system 3090 can generate the spatial audio in a manner that the spatial effects can be perceived by a listener 3040a to 3040c via any audio presentation system configured to provide binaural audio.

Examples of component or elements of an implementation of media device 3000, including those components used to determine proximity of a listener (or audio source), are disclosed in U.S. Patent Application 13/831,422, entitled "Proximity-Based Control of Media Devices," filed on March 14, 2013 with Attorney Docket No. ALI-229, which is incorporated herein by reference. In various examples, media device 3002 is not limited to presenting audio, but rather can present both visual information, including video or other forms of imagery along with (e.g., synchronized with) audio. According to at least some embodiments, the term "audio space" can refer to a two- or three-dimensional space in which sounds can be perceived by a listener as 2D or 3D spatial audio. The term "audio space" can also refer to a two- or three-dimensional space from which audio originates, whereby an audio source can be co-located in the audio space. For example, a listener can perceive spatial audio in an audio space, and that same audio space (or variant thereof) can be associated with audio generated by the listener, such as during a teleconference. The audio space from which the audio originates can be reproduced at a remote location as part of reproduced sound field 3080a. In some cases, the term "audio space" can be used interchangeably with the term "sweet spot." In at least one non-limiting implementation, the size of the sweet spot can range from two to four feet in diameter, whereby a listener can vary its position (i.e., the position of the head and/or ears) and maintain perception of spatial audio. Various examples of microphones that can be implemented as microphones 3010a to 3010c include directional microphones, omni-directional microphones, cardioid microphones,

Blumlein microphones, ORTF stereo microphones, and other types of microphones or microphone systems.

FIG. 31 illustrates an example of a media device configured to facilitate image projection of images in communication with an information appliance, according to some embodiments. Diagram 3100 depicts a media device 3002 configured to receive image data (e.g., video, static imagery, etc.) audio data (e.g., from a remote source of audio) for presentation of video 3014 and/or spatial audio to one or more viewers/listeners based on data received from information appliance 3102. Examples of information appliance 3102 includes set-top boxes or any other device configured to receive data signals, for example, over IP networks, cable TV communication channels, satellite transmission signals and the like.

As shown, controller 3070 is configured to include an information appliance manager 3178 to exchange control data signals with information appliance 3102 to effect various functionalities, such as changing media channels (e.g., via a tuner), electronic programming guide-related actions, DVR-related activities, and the like.

Although the foregoing examples have been described in some detail for purposes of clarity of understanding, the above-described conceptual techniques are not limited to the details provided. There are many alternative ways of implementing the above-described conceptual techniques. The disclosed examples are illustrative and not restrictive.

What is Claimed Is:

1. A media device comprising:

a controller in electrical communication with

a spatial audio generator to generate spatial audio, and

a digital image projector configured to project an image in association with the spatial audio; and

an information appliance manager configured to communicate with an information appliance to control presentation of the spatial audio and the image.

2. The device of Claim 1, wherein the information appliance is a set-top box.

3. The device of Claim 3, wherein the set-top box includes a tuner.

4. The device of Claim 4, wherein the information appliance manager is configured further to modify operation of the tuner to change the presentation of the spatial audio and the image.

5. The device of Claim 1, wherein the information appliance manager is configured further to select an electronic programming guide activity.

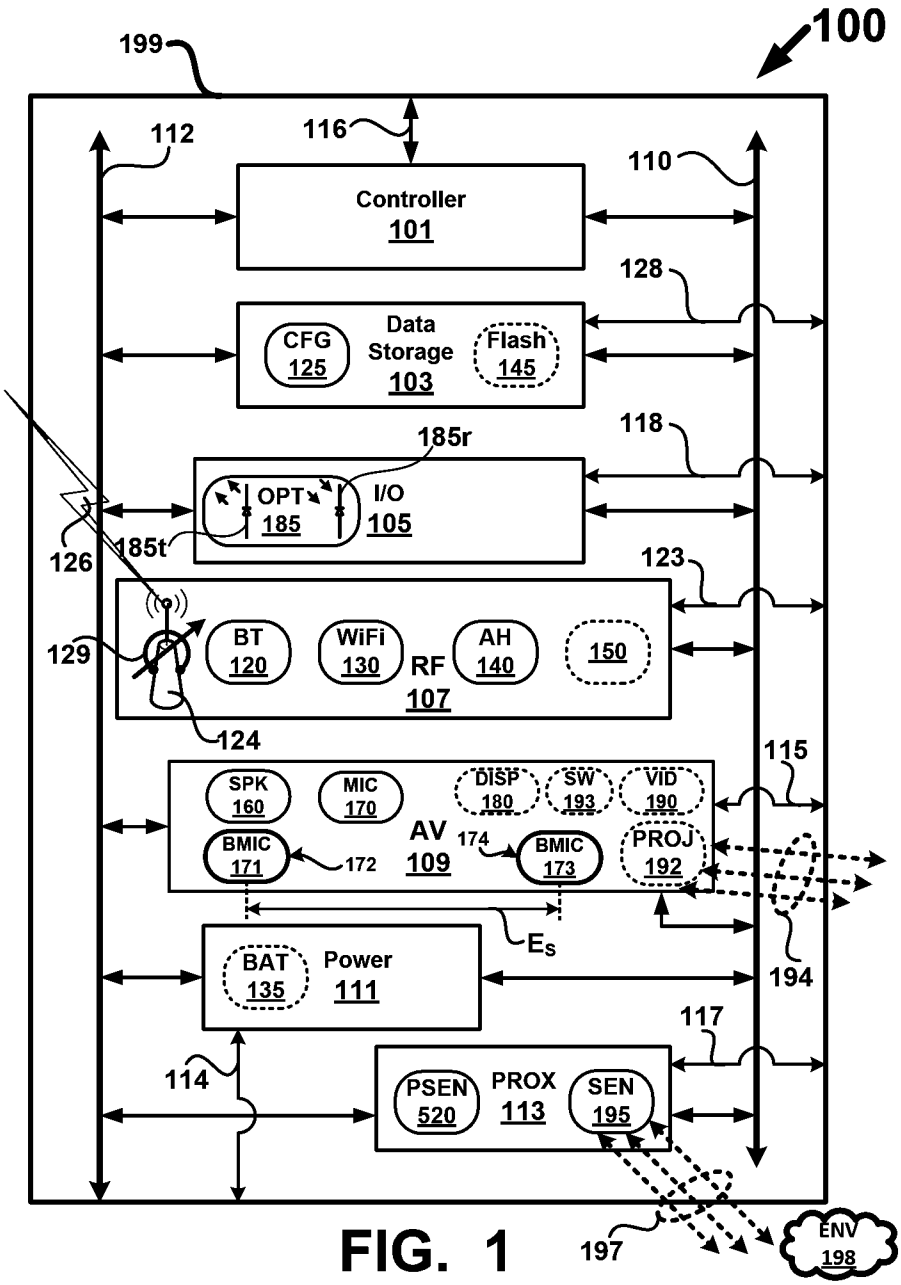
6. A method of operating a media device comprising:

generating spatial audio;

projecting an image in association with the spatial audio; and

communicating with an information appliance to control presentation of the spatial audio and the image.

7. The method of Claim 1, wherein communicating with the information appliance comprises communicating with a set-top box.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CFG
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Storage
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Flash
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126
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109
174
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ENV
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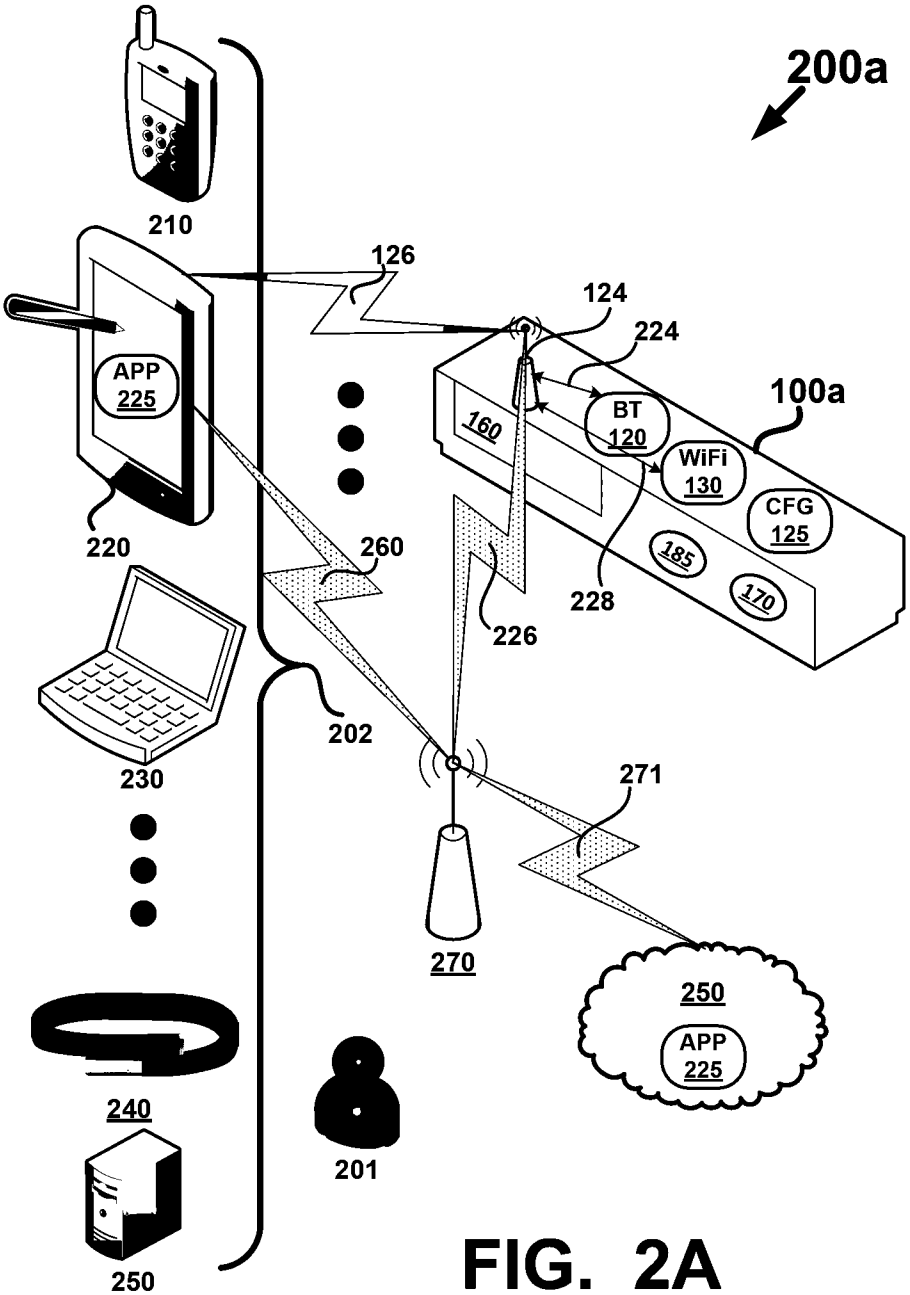
FIG. 1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170
220
260
228
226
230
202
271
270
250
APP
225
240
201
250

FIG. 2A

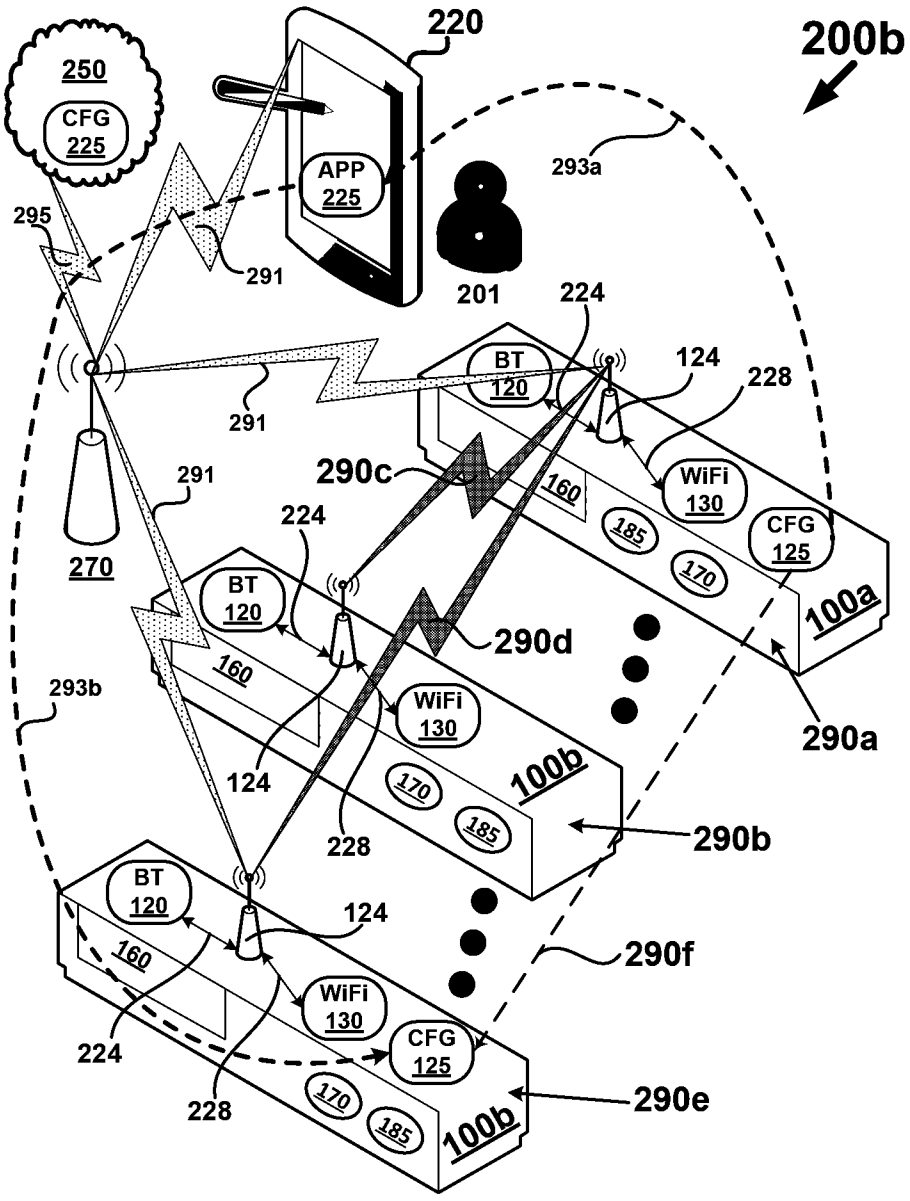
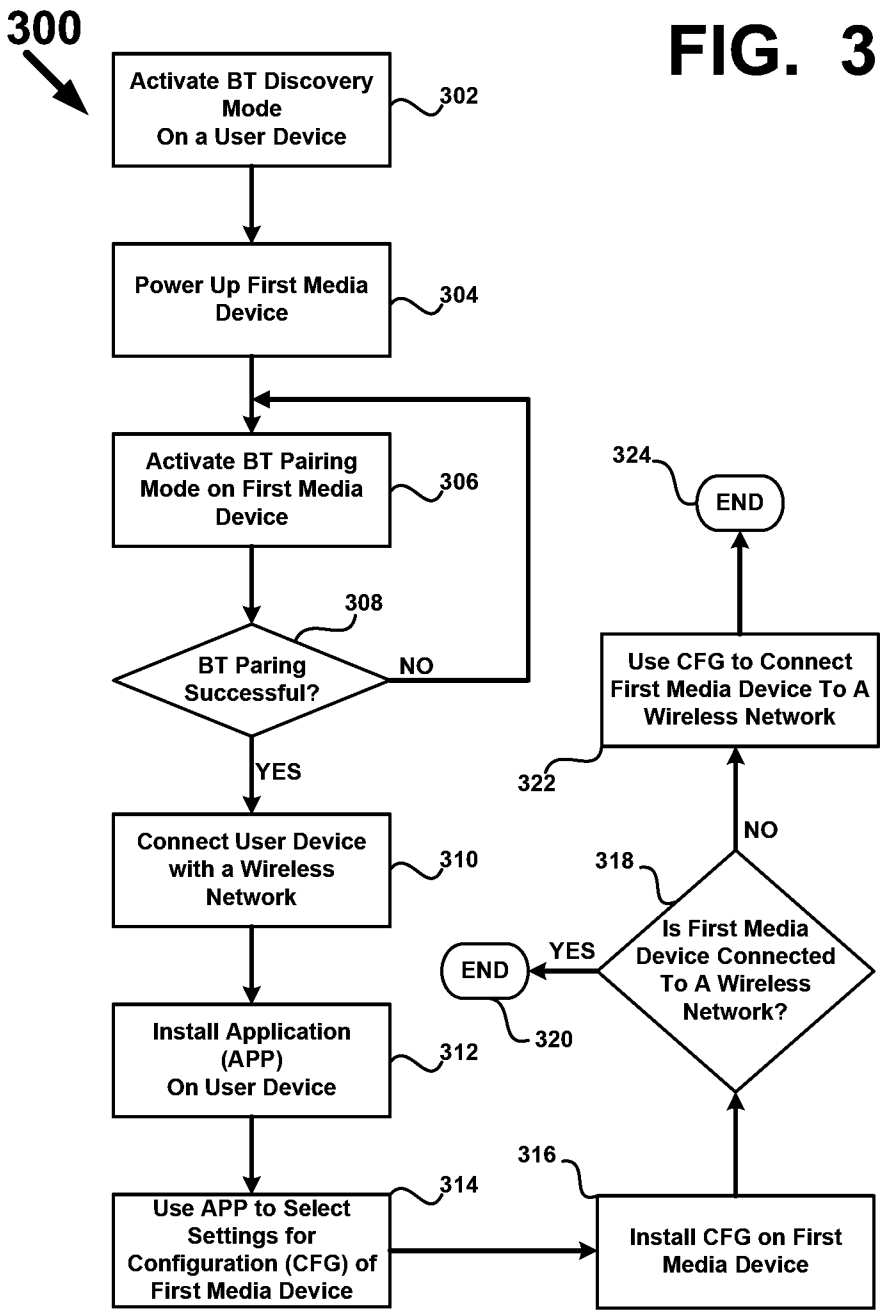

220
200b
250
CFG
225
APP
225
293a
295
291
201
224
BT
120
124
228
291
291
290c
160
WiFi
130
CFG
125
185
170
100a
270
224
BT
120
290d
160
293b
WiFi
130
290a
124
170
100b
228
185
290b
BT
120
124
160
290f
WiFi
130
224
CFG
125
228
170
185
100b
290e

FIG. 2B

FIG. 3


300
Activate BT Discovery Mode On a User Device
302
Power Up First Media Device
304
Activate BT Pairing Mode on First Media Device
306
308
BT Paring Successful?
NO
YES
Connect User Device with a Wireless Network
310
Install Application (APP) On User Device
312
Use APP to Select Settings for Configuration (CFG) of First Media Device
314
316
Install CFG on First Media Device
Is First Media Device Connected To A Wireless Network?
318
YES
END
320
NO
Use CFG to Connect First Media Device To A Wireless Network
322
324
END

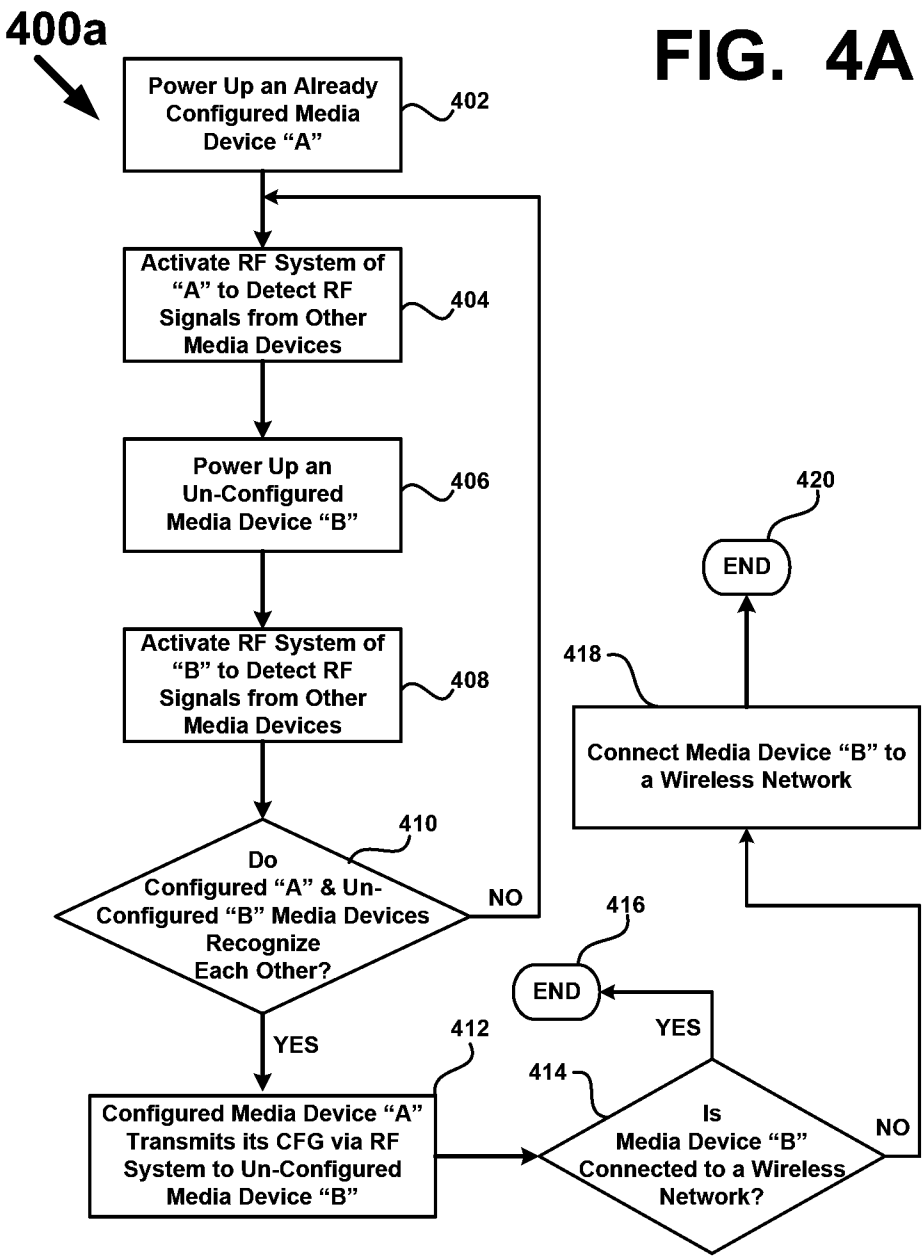

400a
Power Up an Already Configured Media Device "A"
402
Activate RF System of "A" to Detect RF Signals from Other Media Devices
404
Power Up an Un-Configured Media Device "B"
406
Activate RF System of "B" to Detect RF Signals from Other Media Devices
408
Do Configured "A" & Un-Configured "B" Media Devices Recognize Each Other?
410
NO
YES
Configured Media Device "A" Transmits its CFG via RF System to Un-Configured Media Device "B"
412
Is Media Device "B" Connected to a Wireless Network?
414
NO
YES
END
416
Connect Media Device "B" to a Wireless Network
418
END
420

FIG. 4A

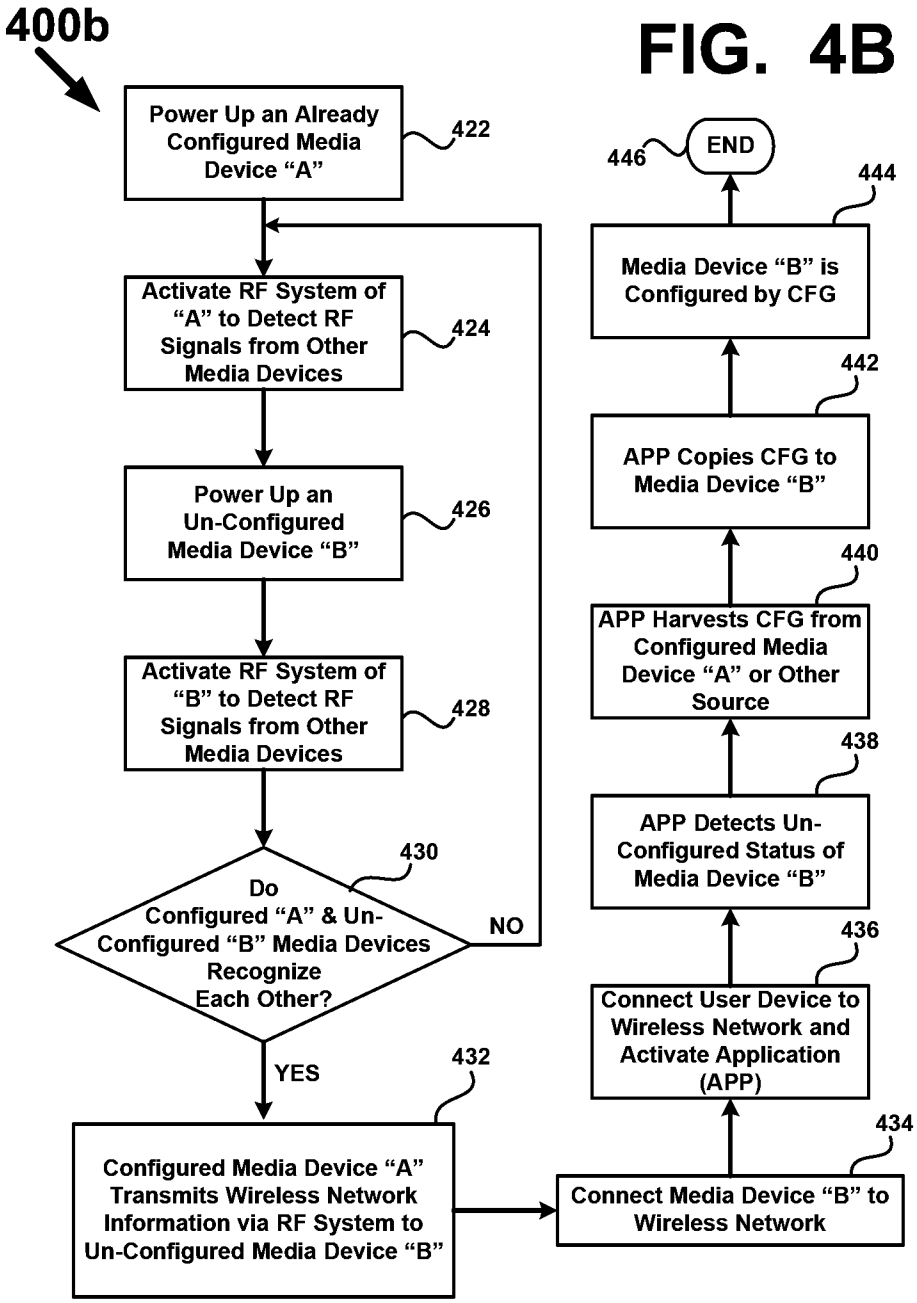

400b
Power Up an Already Configured Media Device "A"
422
Activate RF System of "A" to Detect RF Signals from Other Media Devices
424
Power Up an Un-Configured Media Device "B"
426
Activate RF System of "B" to Detect RF Signals from Other Media Devices
428
Do Configured "A" & Un-Configured "B" Media Devices Recognize Each Other?
430
NO
YES
Configured Media Device "A" Transmits Wireless Network Information via RF System to Un-Configured Media Device "B"
432
Connect Media Device "B" to Wireless Network
434
Connect User Device to Wireless Network and Activate Application (APP)
436
APP Detects Un-Configured Status of Media Device "B"
438
APP Harvests CFG from Configured Media Device "A" or Other Source
440
APP Copies CFG to Media Device "B"
442
Media Device "B" is Configured by CFG
444
END
446

FIG. 4B

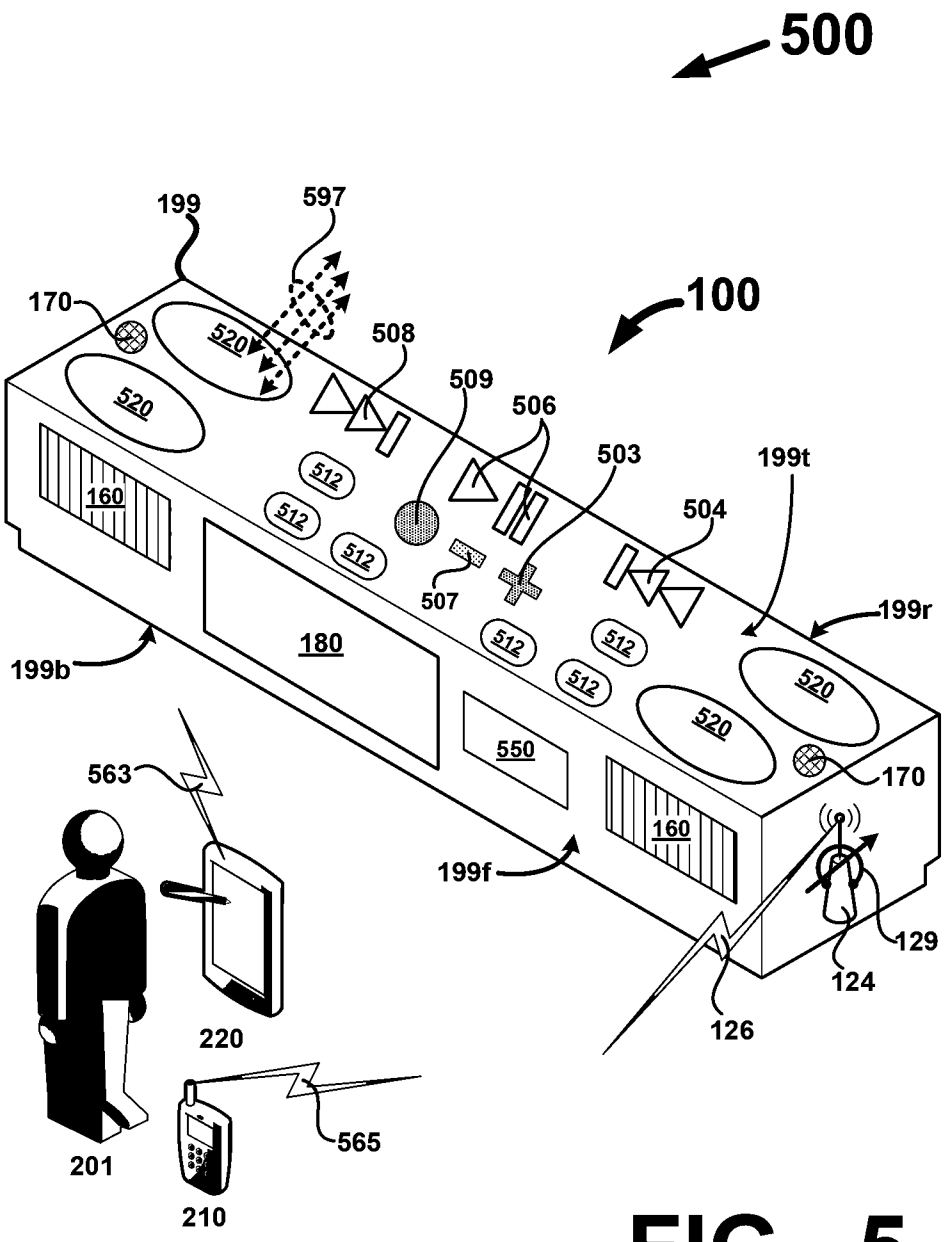

500
100
199
597
170
520
508
509
506
503
199t
504
160
512
507
199r
199b
180
550
563
199f
129
124
126
220
565
201
210

FIG. 5

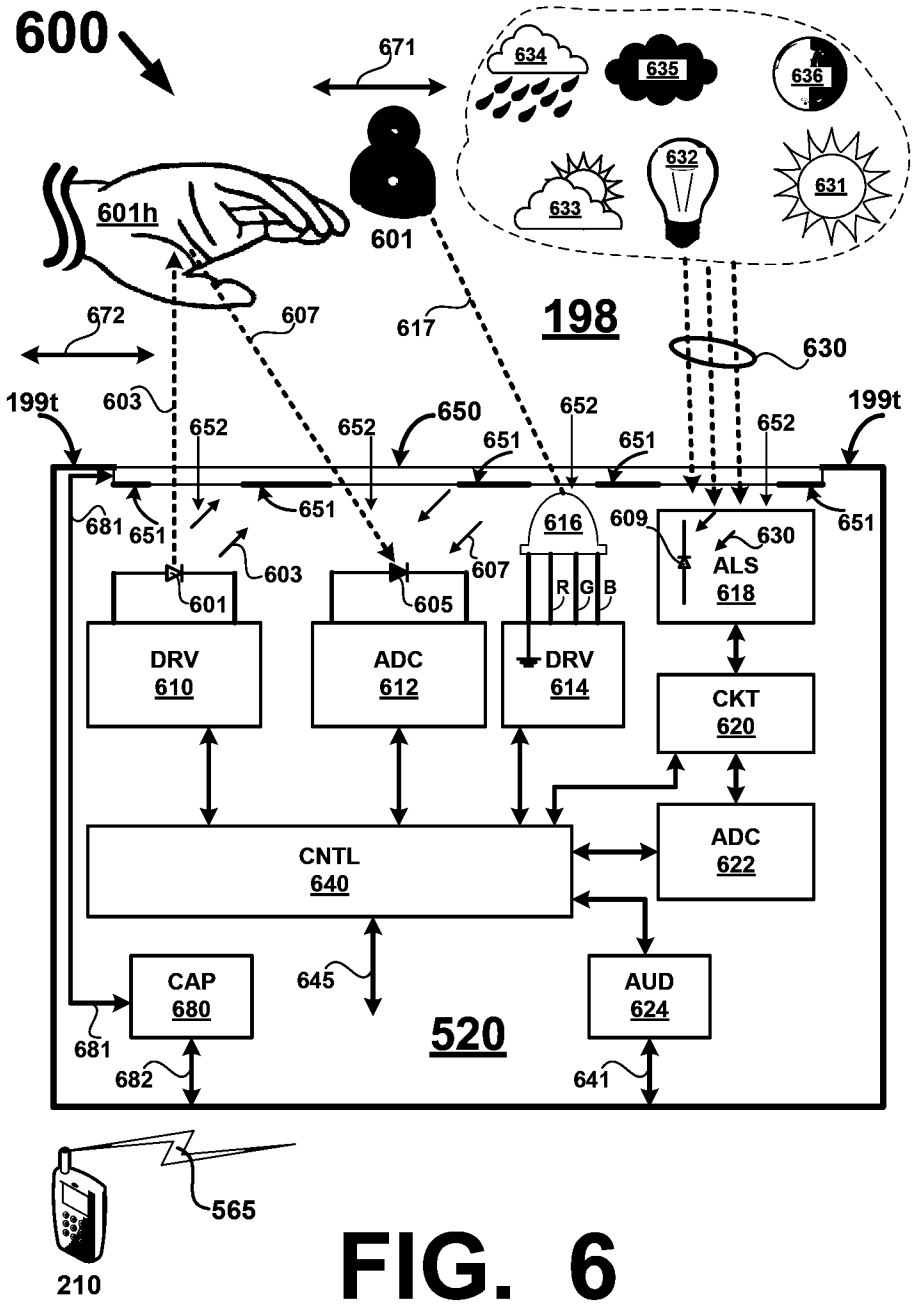

600
671
634
635
636
632
633
631
601h
601
198
672
607
617
630
199t
603
652
650
651
681
616
609
ALS
618
R G B
605
DRV
610
ADC
612
DRV
614
CKT
620
CNTL
640
ADC
622
CAP
680
645
AUD
624
520
682
641
565
210

FIG. 6

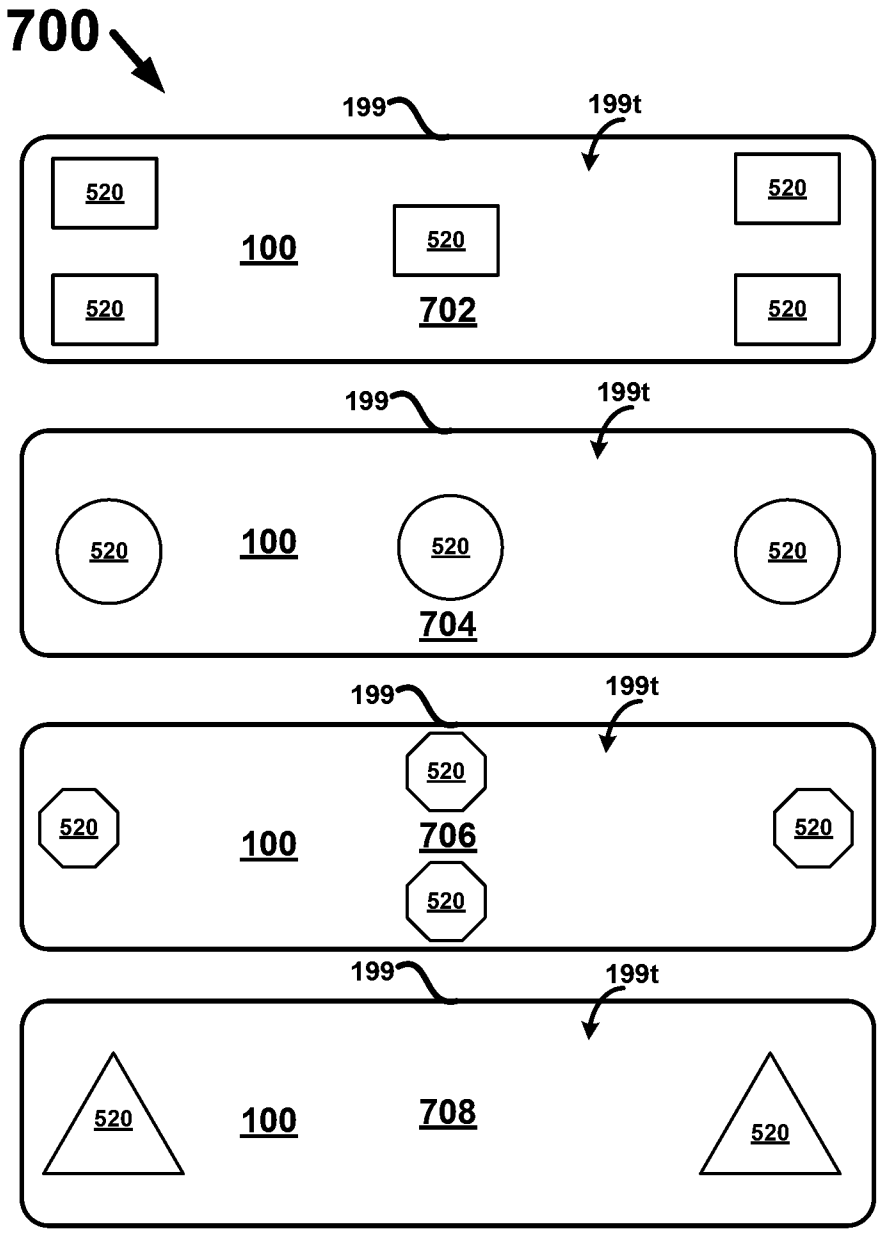

700
199
199t
520
520
100
520
520
520
702
199
199t
520
100
520
520
704
199
199t
520
520
520
100
706
520
199
199t
520
100
708
520

FIG. 7

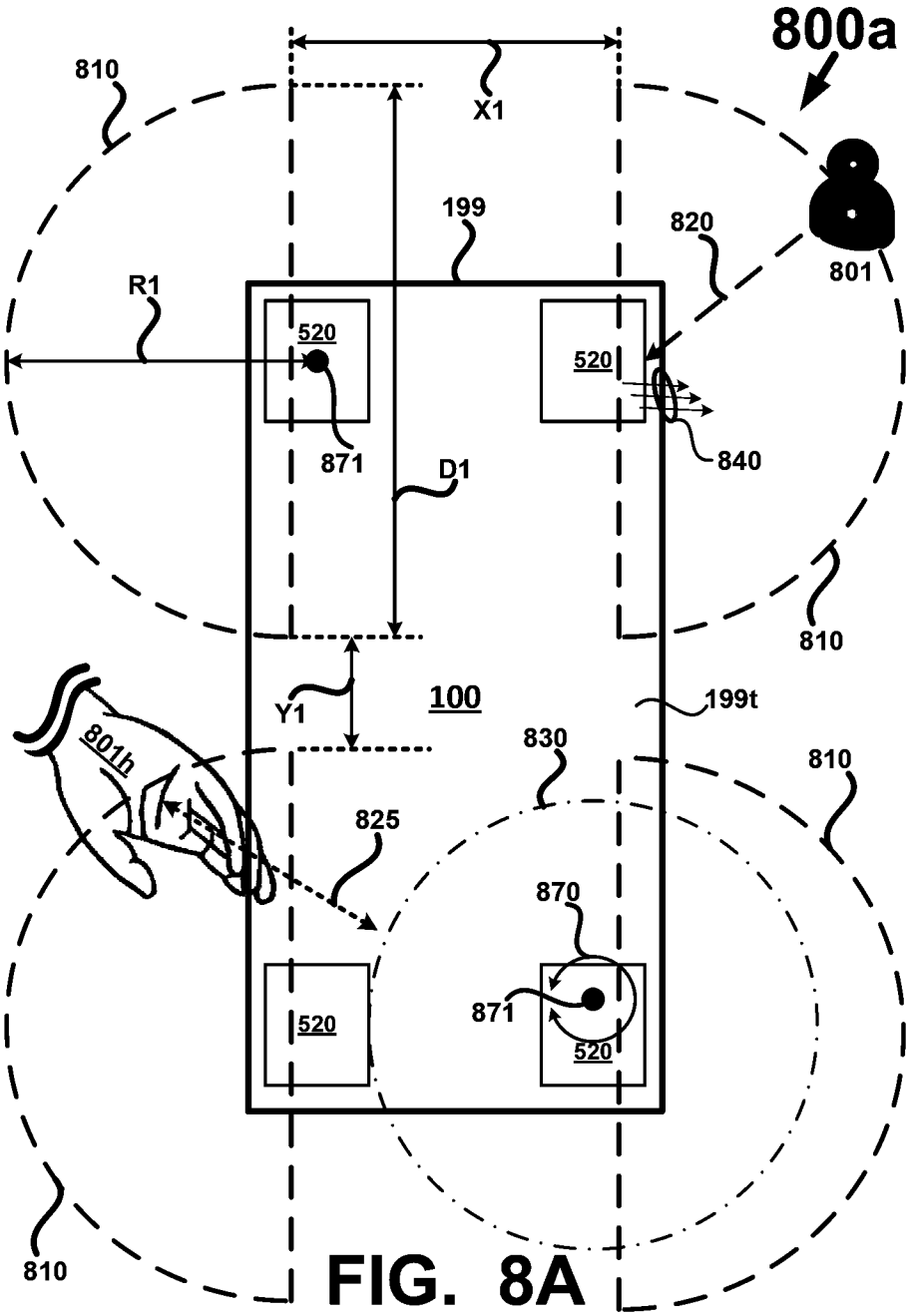

800a
810
X1
199
820
801
R1
520
520
871
D1
840
810
100
199t
Y1
801h
830
810
825
870
871
520
520
810

FIG. 8A

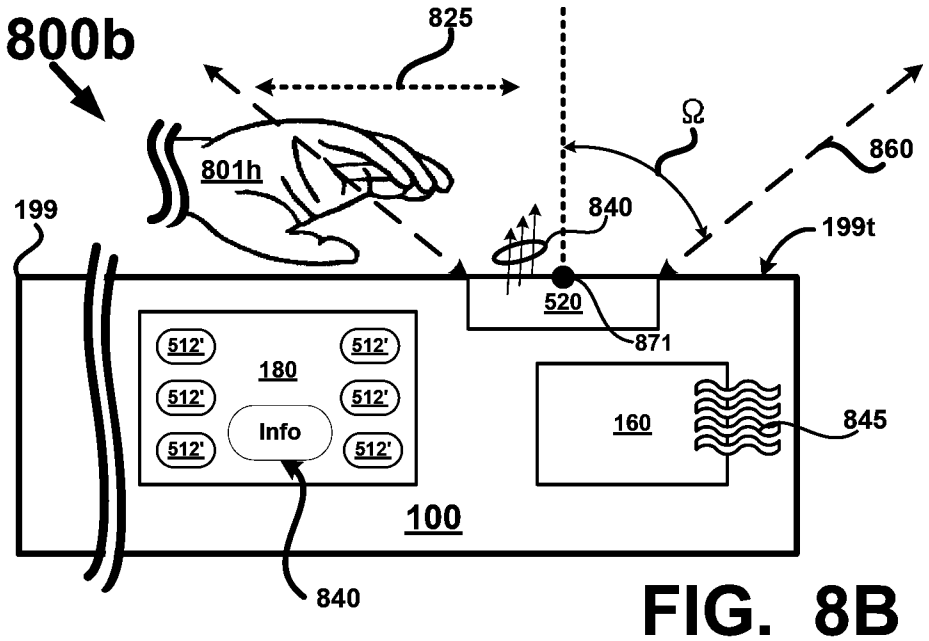

800b
825
801h
Ω
860
199
840
199t
520
871
512'
180
Info
160
845
100
840

FIG. 8B

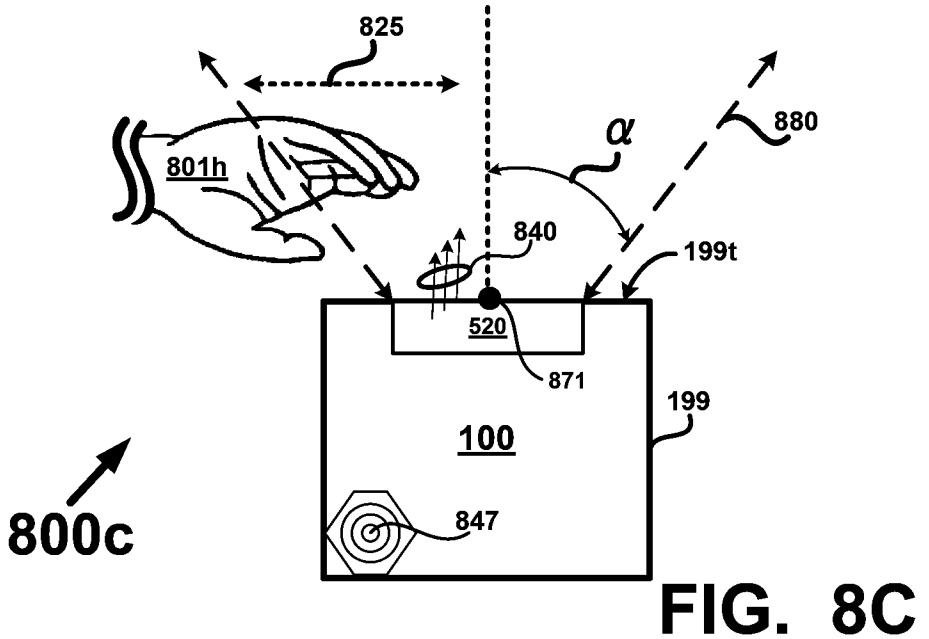

825
801h
α
880
840
199t
520
871
199
100
847
800c

FIG. 8C

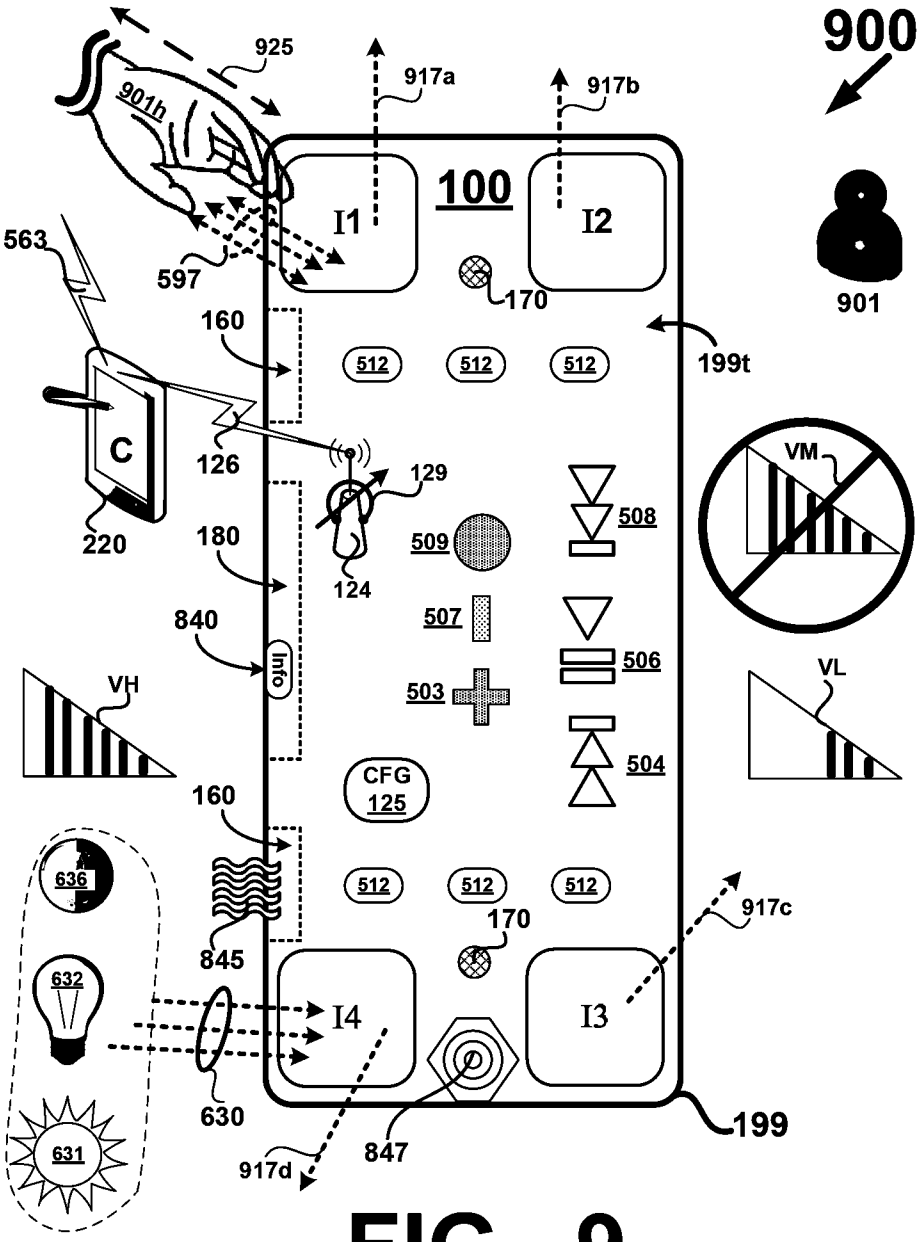

900
925
917a
917b
901h
100
I1
I2
563
597
170
901
160
512
512
512
199t
C
126
129
VM
220
180
509
508
124
507
840
506
Info
VH
503
VL
504
CFG
125
160
636
512
512
512
917c
170
845
632
I4
I3
630
199
631
917d
847

FIG. 9

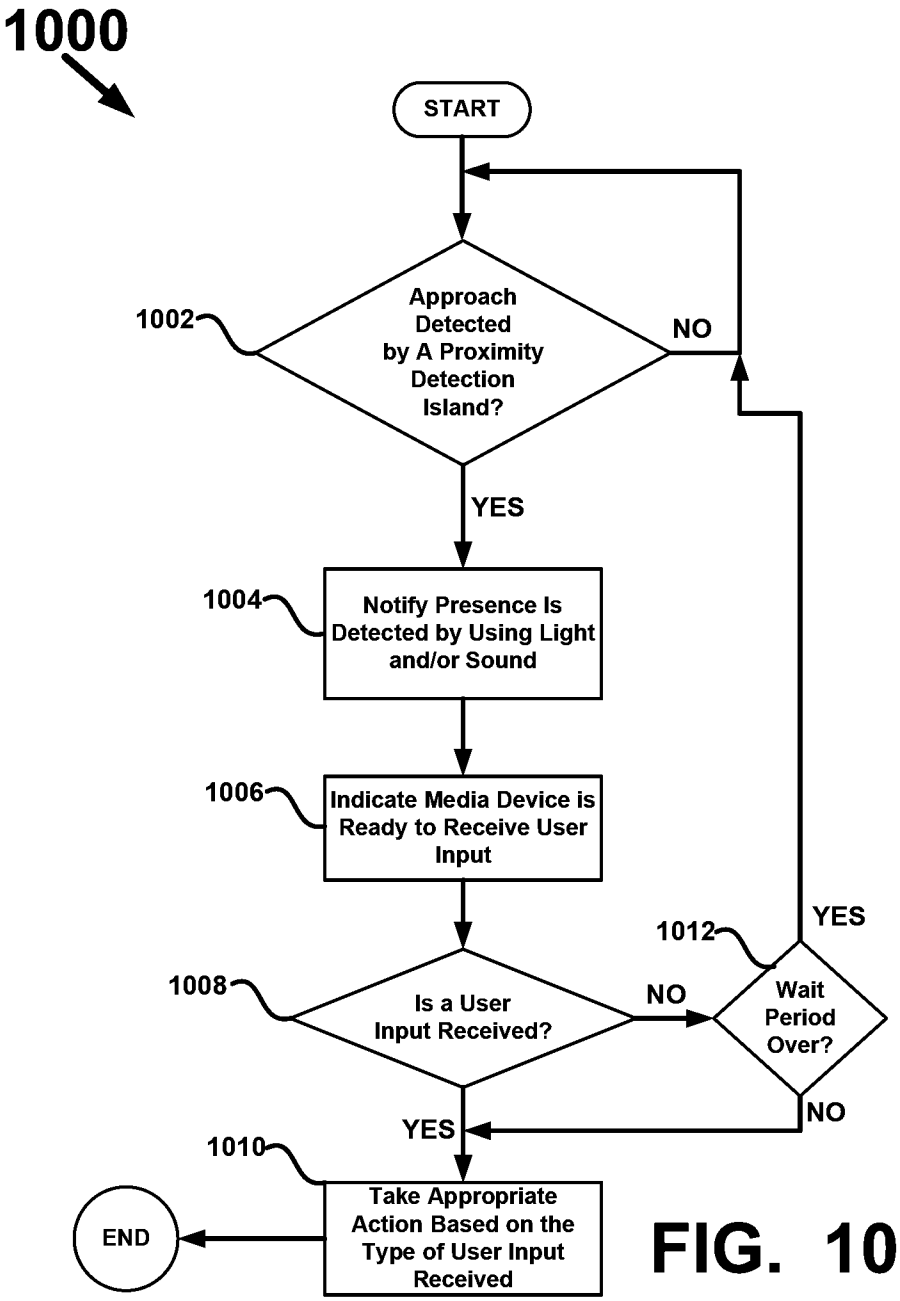

1000
START
1002
Approach Detected by A Proximity Detection Island?
NO
YES
1004
Notify Presence Is Detected by Using Light and/or Sound
1006
Indicate Media Device is Ready to Receive User Input
1012
YES
1008
Is a User Input Received?
NO
Wait Period Over?
NO
YES
1010
Take Appropriate Action Based on the Type of User Input Received
END

FIG. 10

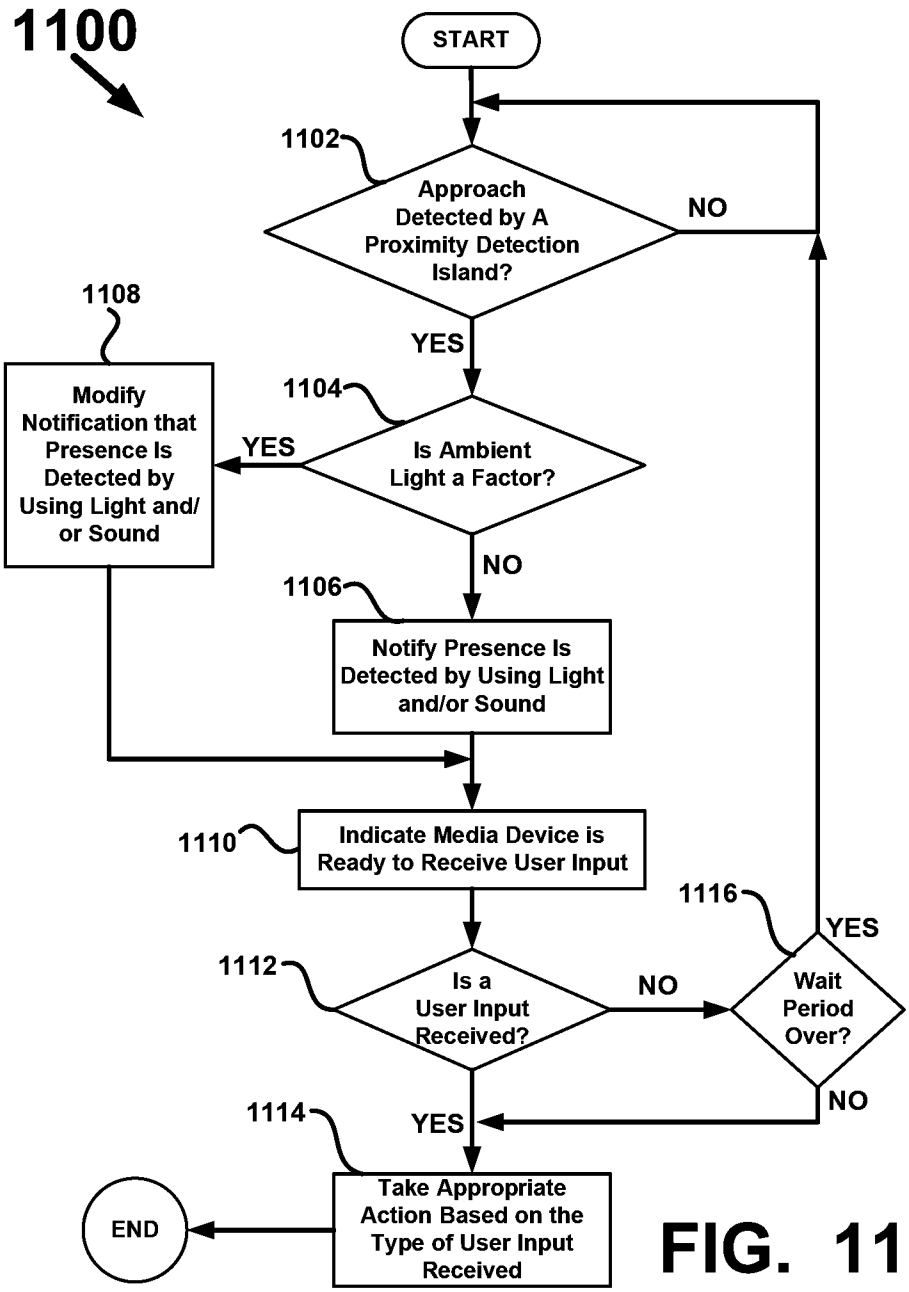

1100
START
1102
Approach Detected by A Proximity Detection Island?
NO
YES
1108
Modify Notification that Presence Is Detected by Using Light and/ or Sound
1104
YES
Is Ambient Light a Factor?
NO
1106
Notify Presence Is Detected by Using Light and/or Sound
1110
Indicate Media Device is Ready to Receive User Input
1116
YES
1112
Is a User Input Received?
NO
Wait Period Over?
NO
1114
YES
Take Appropriate Action Based on the Type of User Input Received
END

FIG. 11

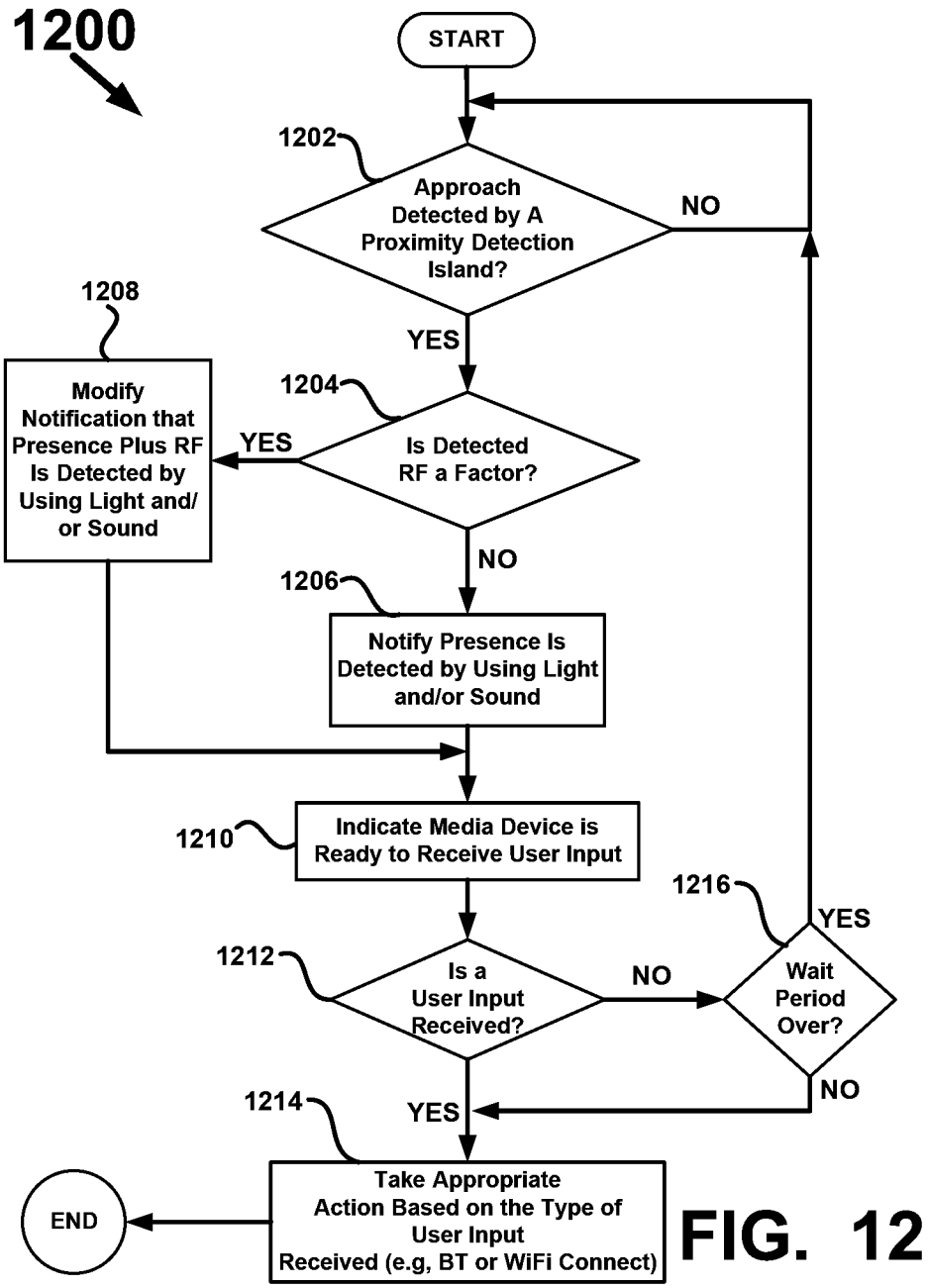

1200
START
1202
Approach Detected by A Proximity Detection Island?
NO
YES
1208
Modify Notification that Presence Plus RF Is Detected by Using Light and/ or Sound
1204
YES
Is Detected RF a Factor?
NO
1206
Notify Presence Is Detected by Using Light and/or Sound
1210
Indicate Media Device is Ready to Receive User Input
1216
YES
1212
Is a User Input Received?
NO
Wait Period Over?
NO
1214
YES
END
Take Appropriate Action Based on the Type of User Input Received (e.g, BT or WiFi Connect)

FIG. 12

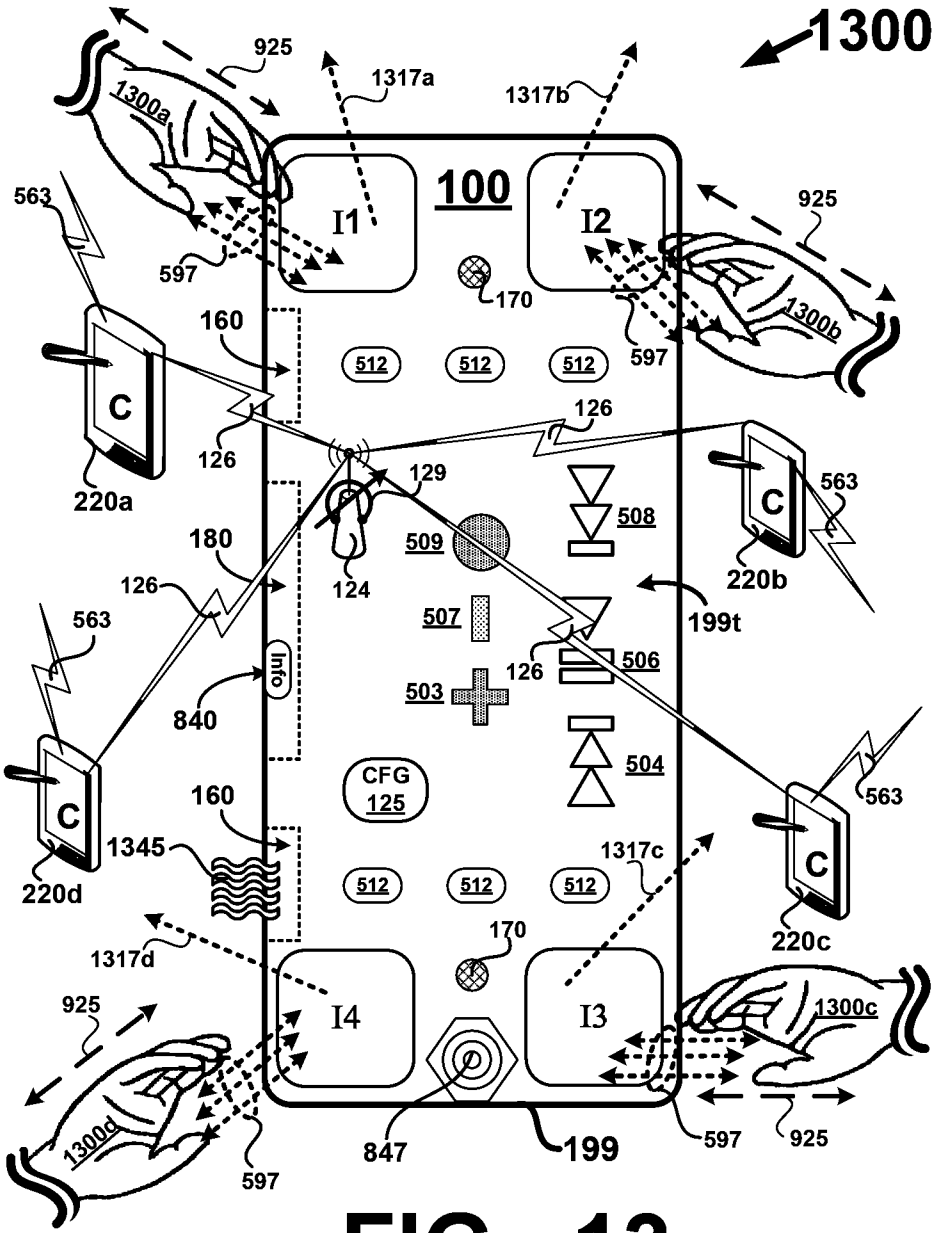

1300
925
1317a
1317b
1300a
100
I1
I2
563
597
170
925
1300b
160
512
512
512
597
C
126
126
220a
129
508
563
C
180
509
124
220b
126
199t
563
507
126
506
Info
503
840
504
CFG
125
563
C
160
1345
1317c
C
220d
512
512
512
220c
170
1317d
925
I4
I3
1300c
1300d
847
199
597
925
597

FIG. 13

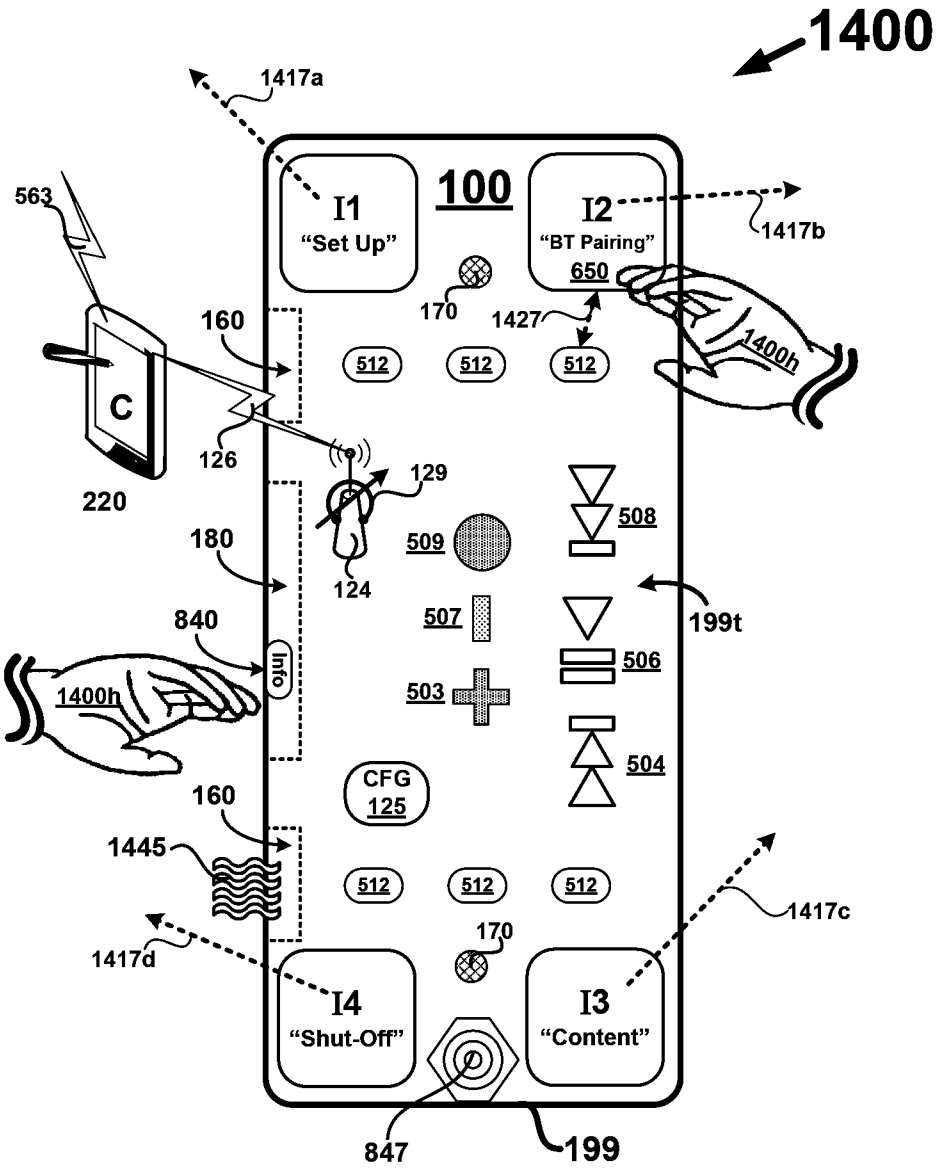

1400
1417a
100
I1
"Set Up"
I2
"BT Pairing"
650
1417b
563
170
1427
1400h
160
512
512
512
C
126
220
129
508
180
509
124
199t
840
507
506
Info
1400h
503
504
CFG
125
160
1445
512
512
512
1417c
170
1417d
I4
"Shut-Off"
I3
"Content"
847
199

FIG. 14

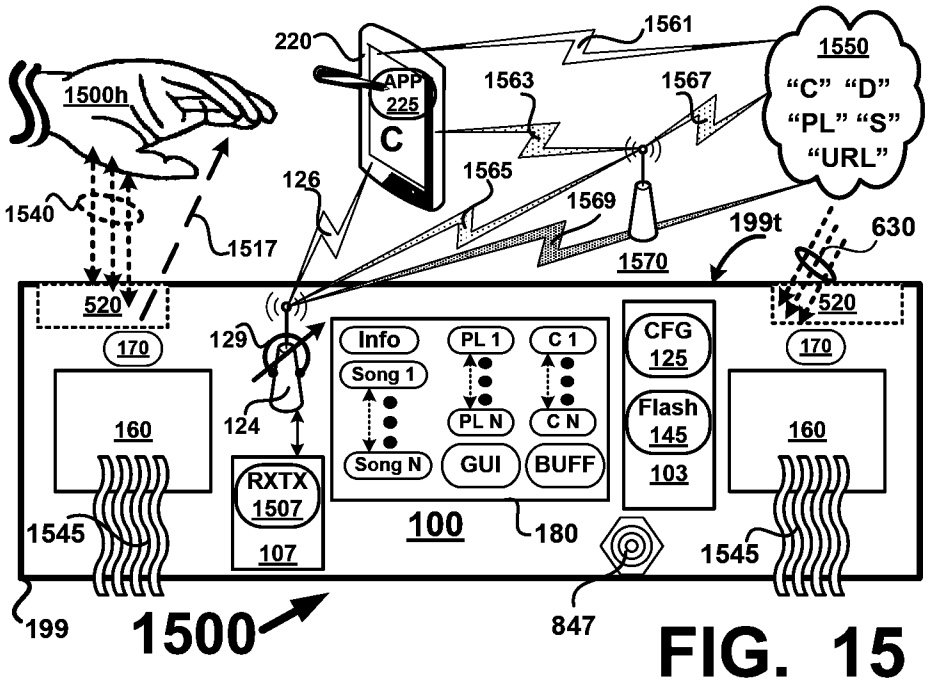

1500h
220
APP 225
C
1561
1563
1567
1550
"C" "D"
"PL" "S"
"URL"
1565
1569
126
1540
1517
1570
199t
630
520
520
170
170
129
124
Info
Song 1
Song N
PL 1
PL N
C 1
C N
GUI
BUFF
CFG 125
Flash 145
103
160
160
RXTX 1507
107
1545
1545
100
180
199
1500
847

FIG. 15

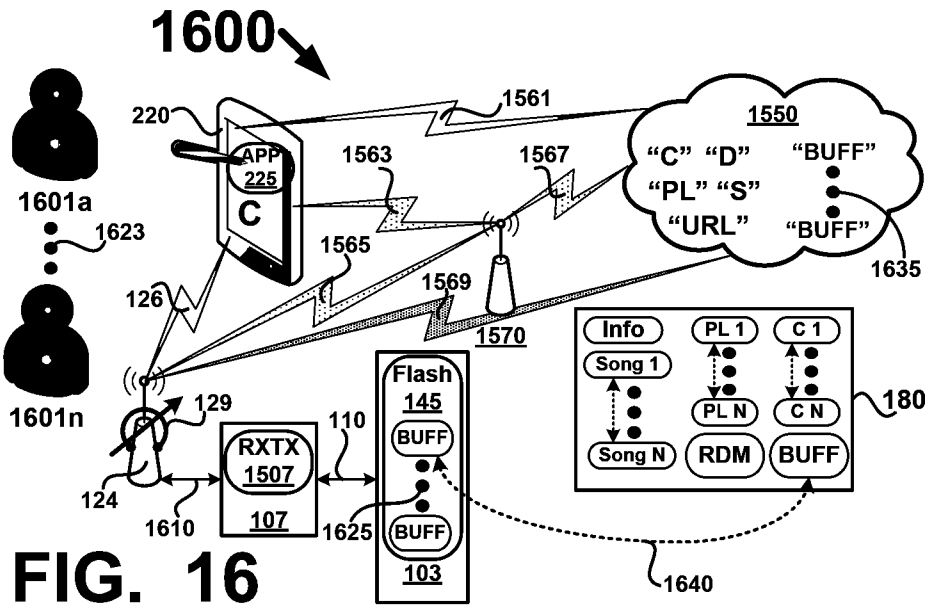

1600
1601a
1601n
1623
220
APP 225
C
1561
1563
1567
1550
"C" "D"
"PL" "S"
"URL"
"BUFF"
"BUFF"
1635
1565
1569
126
1570
Info
Song 1
Song N
PL 1
PL N
C 1
C N
RDM
BUFF
180
129
110
Flash 145
BUFF
RXTX 1507
107
124
1610
1625
BUFF
103
1640

FIG. 16

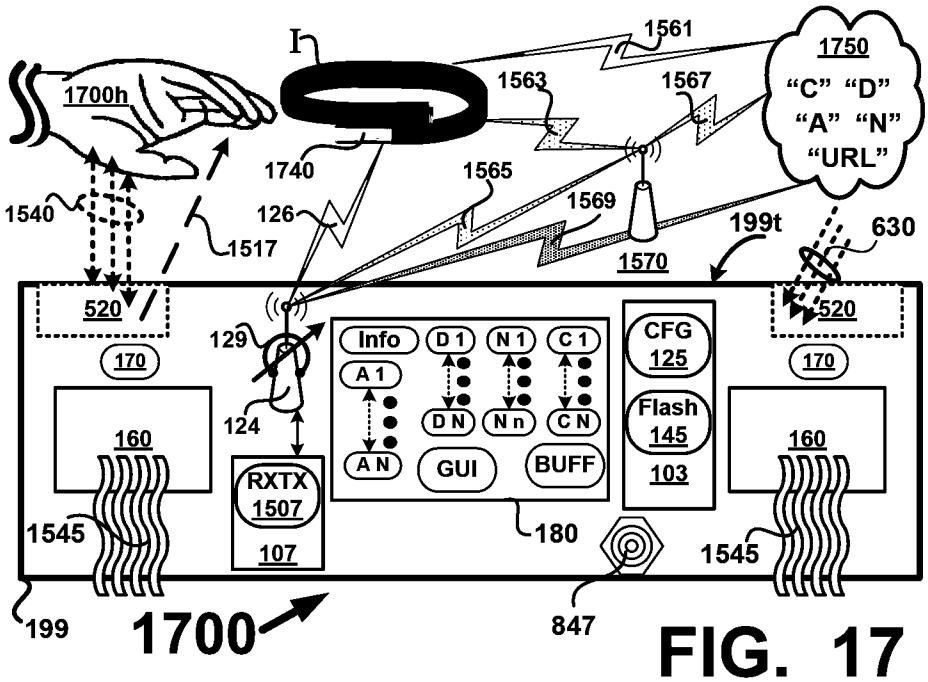

1700h
1740
1561
1563
1567
1750
"C" "D"
"A" "N"
"URL"
1565
1569
1540
126
1517
1570
199t
630
520
520
129
Info
D 1
N 1
C 1
CFG
125
170
170
A 1
D N
N n
C N
Flash
145
124
160
160
A N
GUI
BUFF
103
RXTX
1507
1545
107
180
1545
199
1700
847

FIG. 17

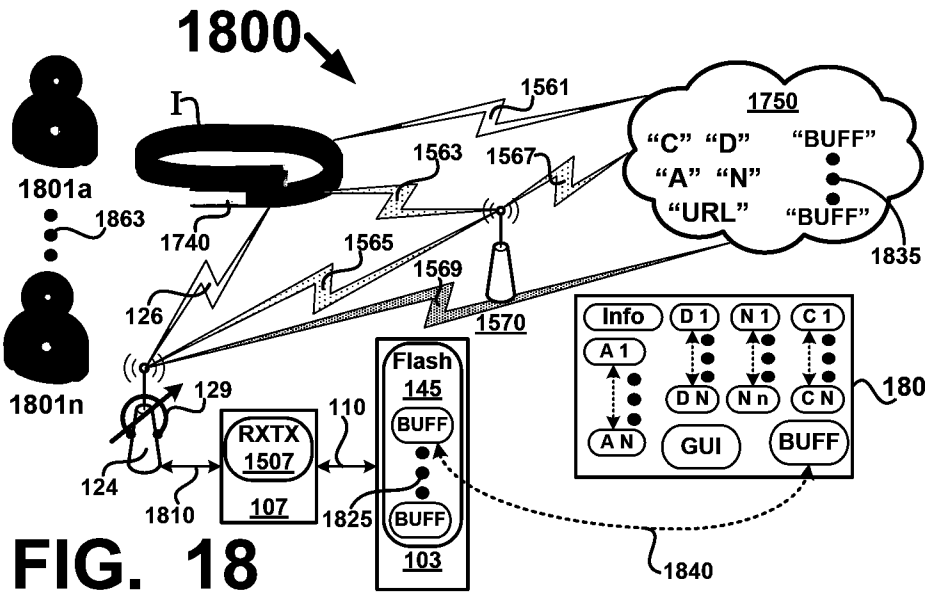

1800
1561
1750
"C" "D"
"A" "N"
"URL"
"BUFF"
"BUFF"
1563
1567
1801a
1863
1740
1565
1835
1569
126
1570
Info
D 1
N 1
C 1
A 1
Flash
145
180
129
110
D N
N n
C N
RXTX
1507
BUFF
A N
GUI
BUFF
124
1810
107
1825
BUFF
103
1840
1801n

FIG. 18

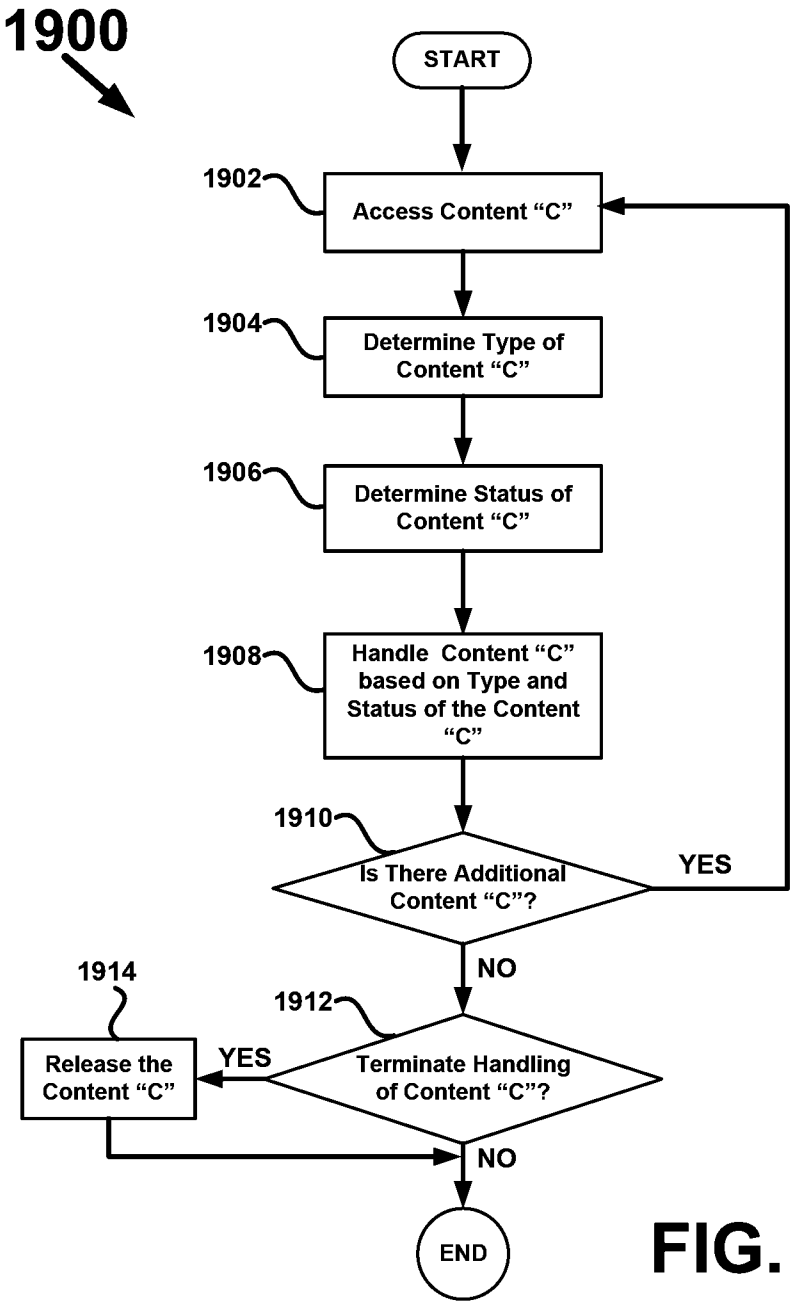

1900
START
1902
Access Content "C"
1904
Determine Type of Content "C"
1906
Determine Status of Content "C"
1908
Handle Content "C" based on Type and Status of the Content "C"
1910
Is There Additional Content "C"?
YES
NO
1914
1912
Release the Content "C"
YES
Terminate Handling of Content "C"?
NO
END

FIG. 19

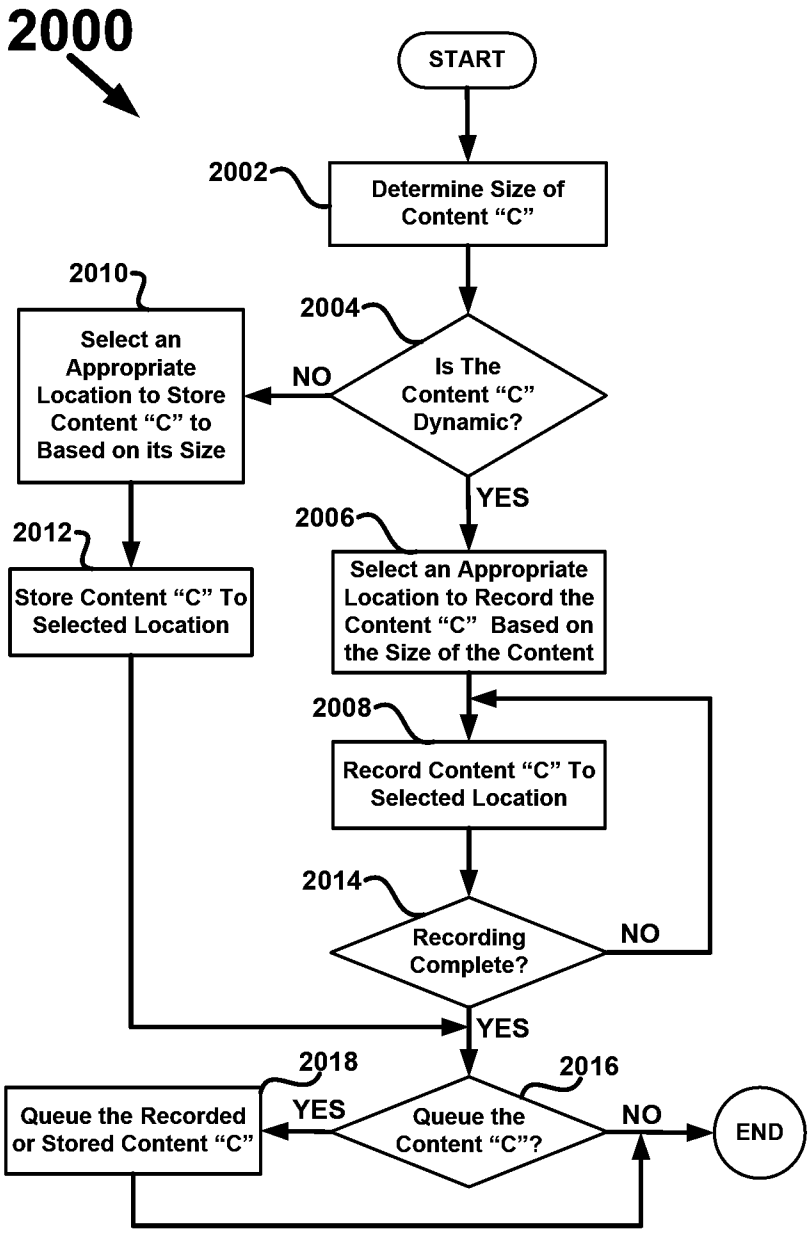

2000
START
2002
Determine Size of Content "C"
2004
Is The Content "C" Dynamic?
NO
2010
Select an Appropriate Location to Store Content "C" to Based on its Size
YES
2006
Select an Appropriate Location to Record the Content "C" Based on the Size of the Content
2012
Store Content "C" To Selected Location
2008
Record Content "C" To Selected Location
2014
Recording Complete?
NO
YES
2018
2016
Queue the Recorded or Stored Content "C"
YES
Queue the Content "C"?
NO
END

FIG. 20

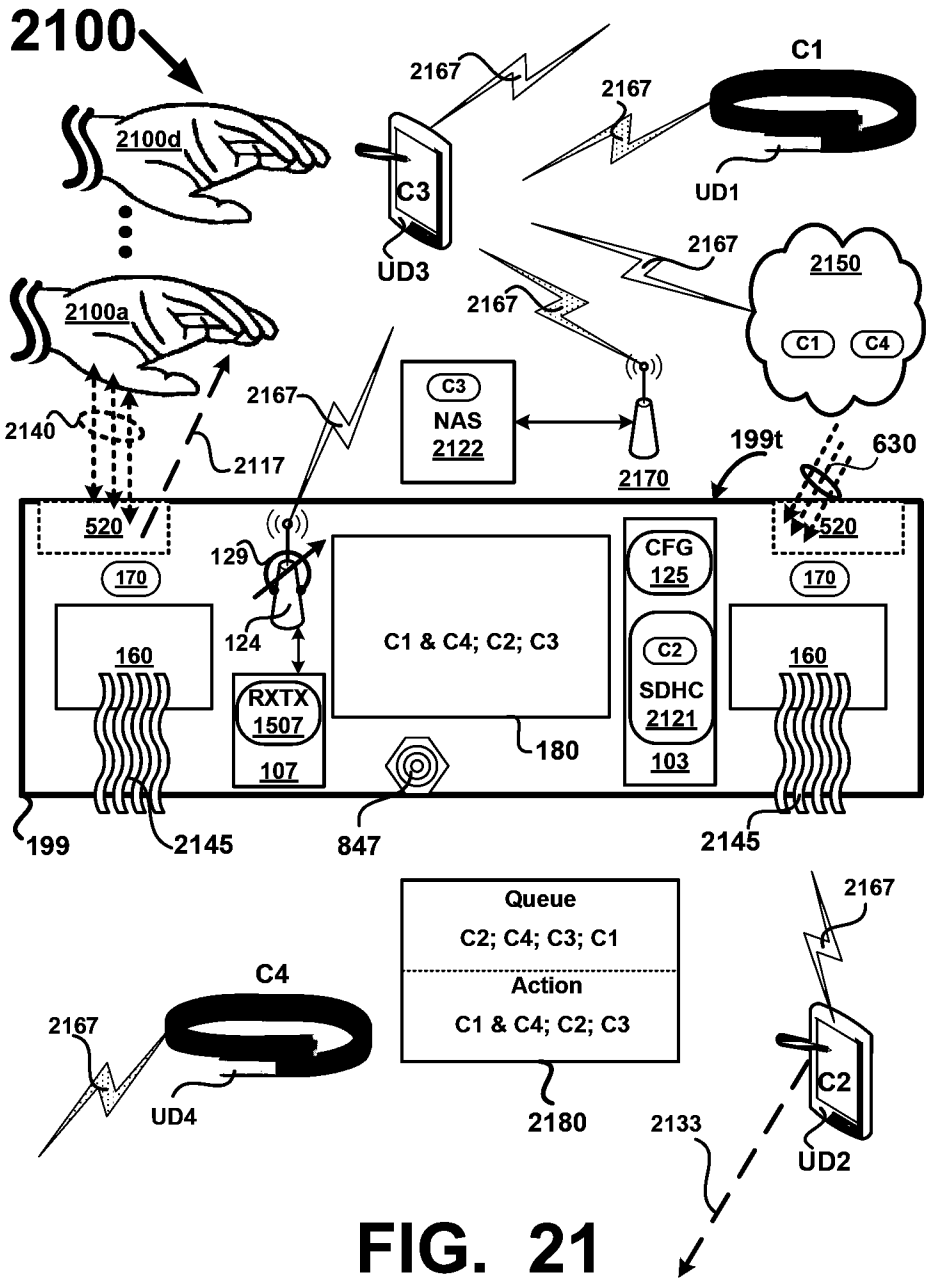

2100
2100d
2100a
2140
2117
2167
2167
2167
2167
C3
UD3
C1
UD1
2150
C1
C4
C3
NAS
2122
2170
199t
630
520
520
170
170
129
124
160
160
RXTX
1507
107
C1 & C4; C2; C3
180
CFG
125
C2
SDHC
2121
103
199
2145
847
2145
Queue
C2; C4; C3; C1
Action
C1 & C4; C2; C3
2180
C4
UD4
C2
UD2
2133

FIG. 21

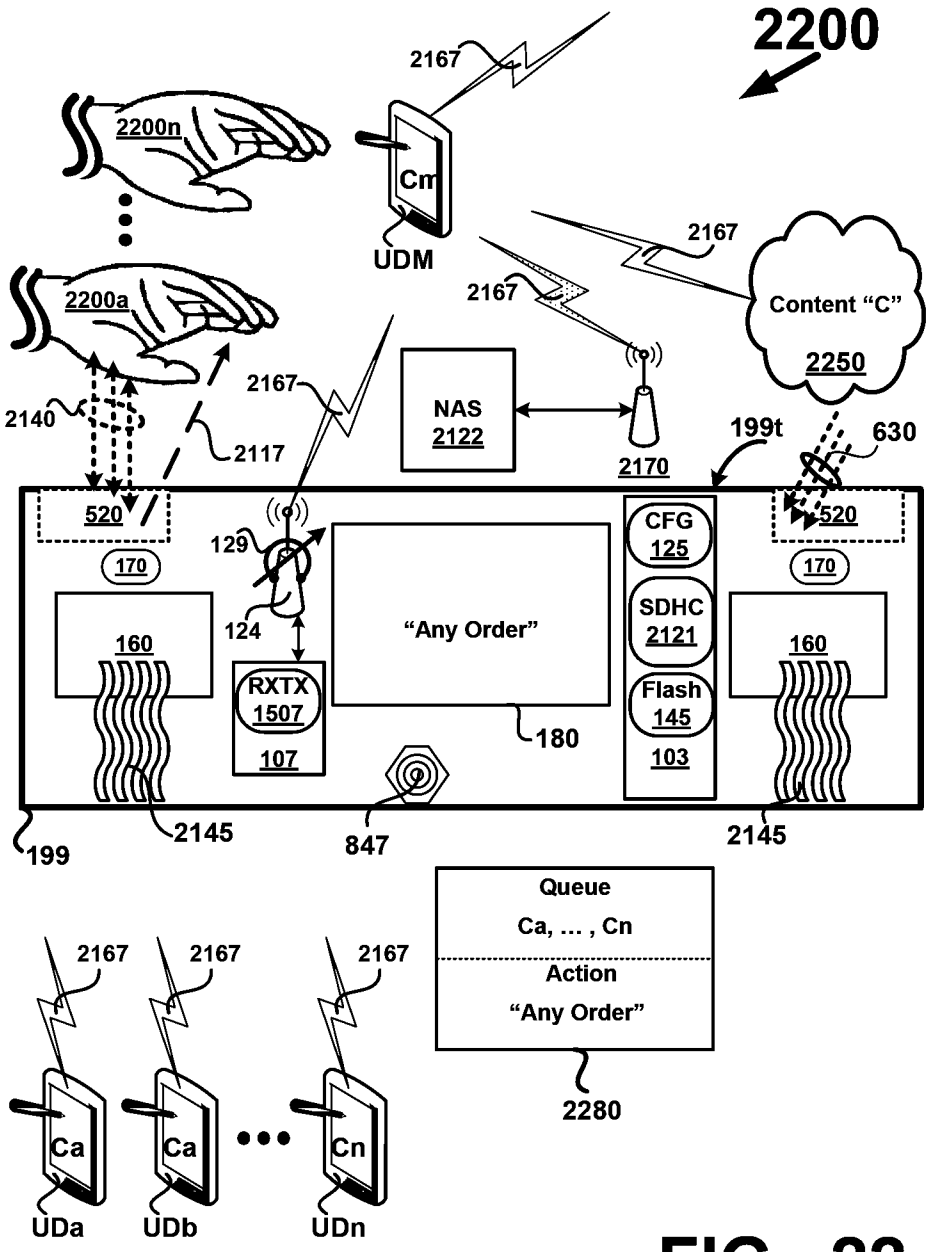
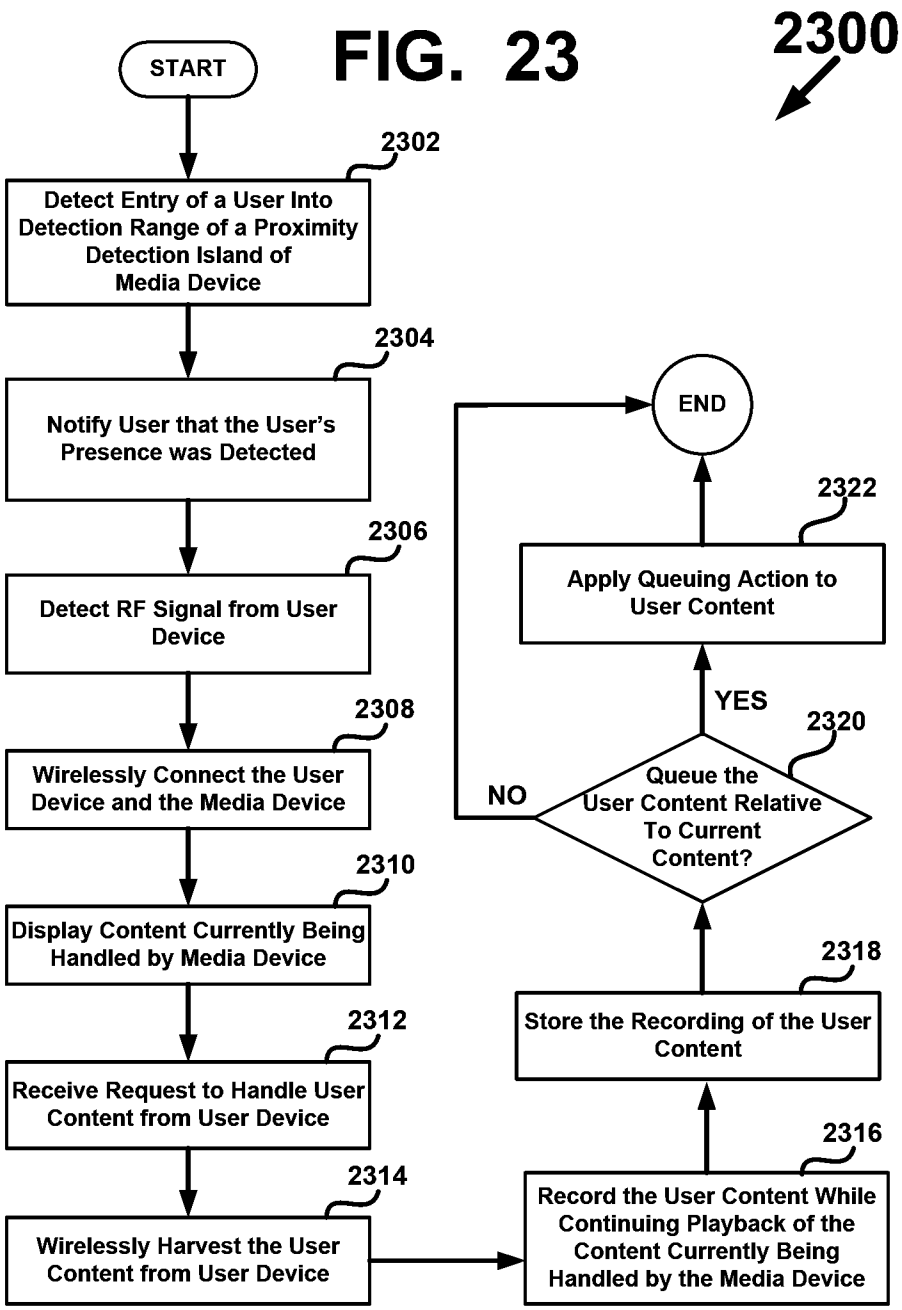

2200
2167
2200n
Cm
UDM
2167
2200a
2167
Content "C"
2250
2167
NAS
2122
2140
2117
2170
199t
630
520
520
129
170
170
CFG
125
124
"Any Order"
SDHC
2121
160
160
RXTX
1507
Flash
145
107
180
103
199
2145
847
2145
Queue
Ca, ... , Cn
Action
"Any Order"
2167
2167
2167
2280
Ca
Ca
Cn
UDa
UDb
UDn

FIG. 22

FIG. 23


2300
START
2302
Detect Entry of a User Into Detection Range of a Proximity Detection Island of Media Device
2304
Notify User that the User's Presence was Detected
2306
Detect RF Signal from User Device
2308
Wirelessly Connect the User Device and the Media Device
2310
Display Content Currently Being Handled by Media Device
2312
Receive Request to Handle User Content from User Device
2314
Wirelessly Harvest the User Content from User Device
2316
Record the User Content While Continuing Playback of the Content Currently Being Handled by the Media Device
2318
Store the Recording of the User Content
2320
Queue the User Content Relative To Current Content?
YES
NO
2322
Apply Queuing Action to User Content
END

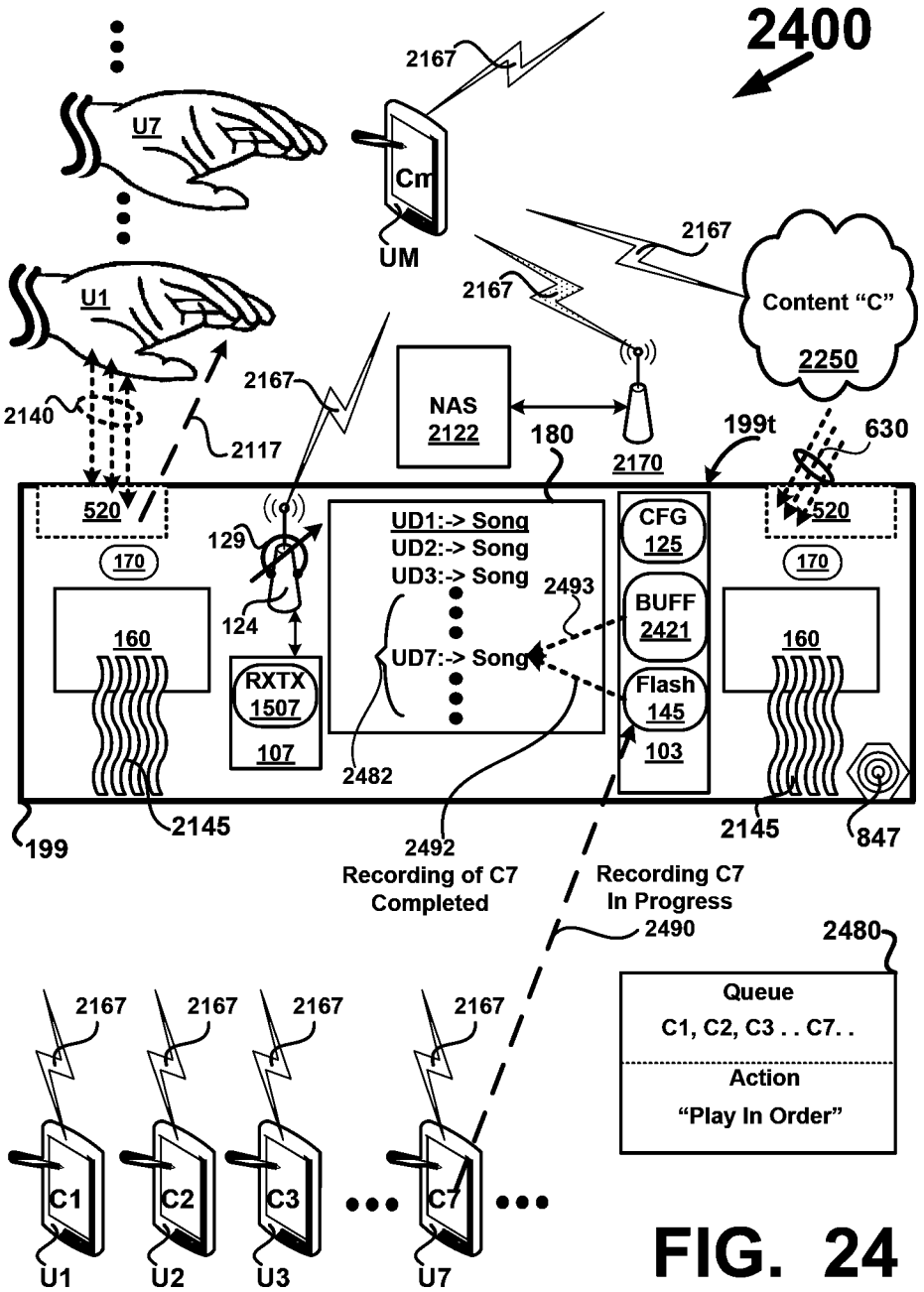

2400
2167
U7
Cm
UM
2167
Content "C"
2250
U1
2167
2167
NAS
2122
180
2170
199t
630
2140
2117
520
170
129
124
UD1:-> Song
UD2:-> Song
UD3:-> Song
UD7:-> Song
2493
CFG
125
BUFF
2421
Flash
145
103
520
170
160
RXTX
1507
107
160
2482
2145
199
2492
Recording of C7
Completed
Recording C7
In Progress
2145
847
2490
2480
Queue
C1, C2, C3 . . C7. .
Action
"Play In Order"
2167
2167
2167
2167
C1
C2
C3
C7
U1
U2
U3
U7

FIG. 24

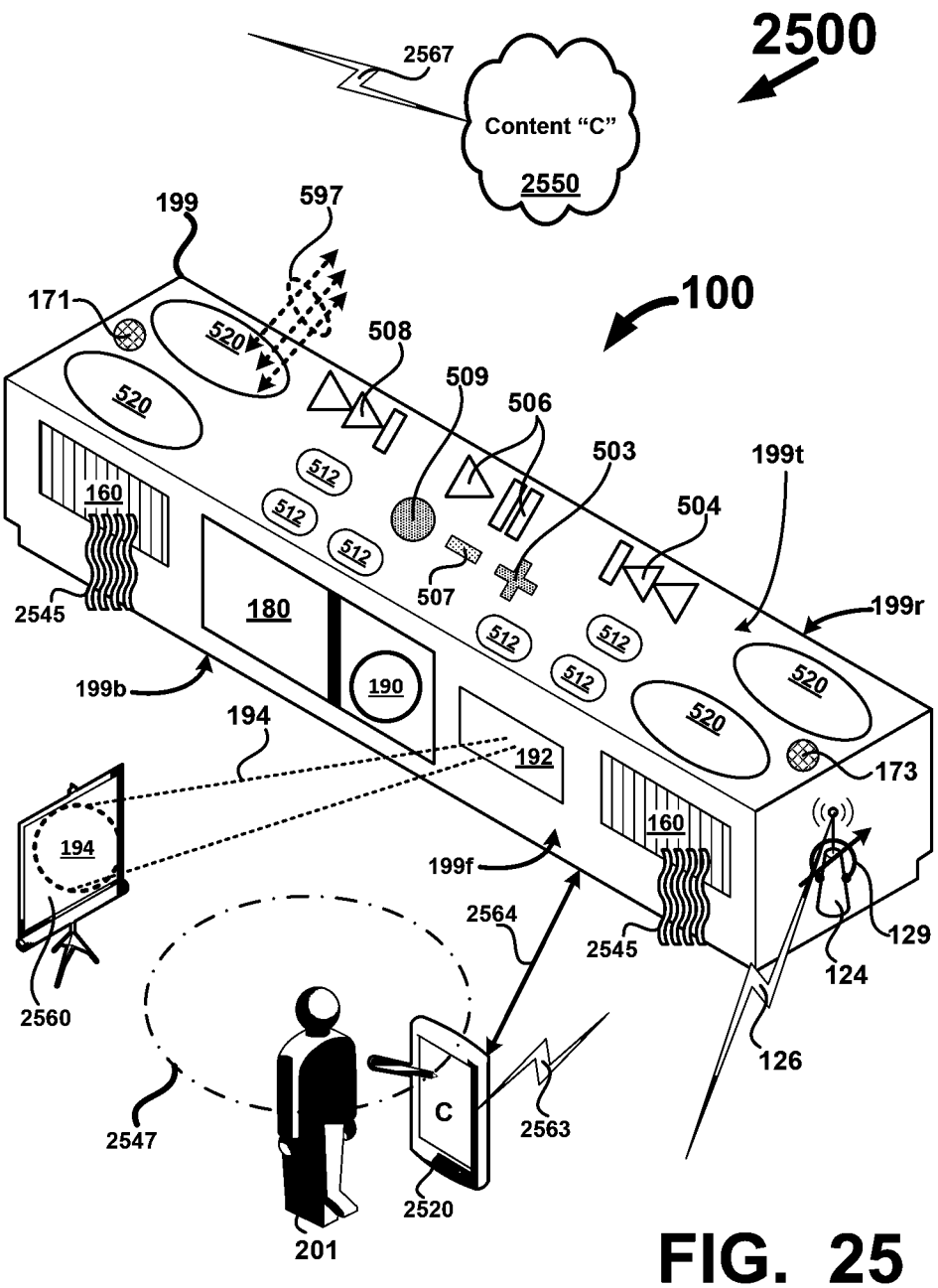

2500
2567
Content "C"
2550
199
597
171
520
520
100
508
509
506
503
199t
504
512
512
512
160
2545
180
507
199r
512
512
512
520
520
199b
190
194
192
173
194
160
199f
2564
2545
129
124
2560
126
2547
C
2563
2520
201

FIG. 25

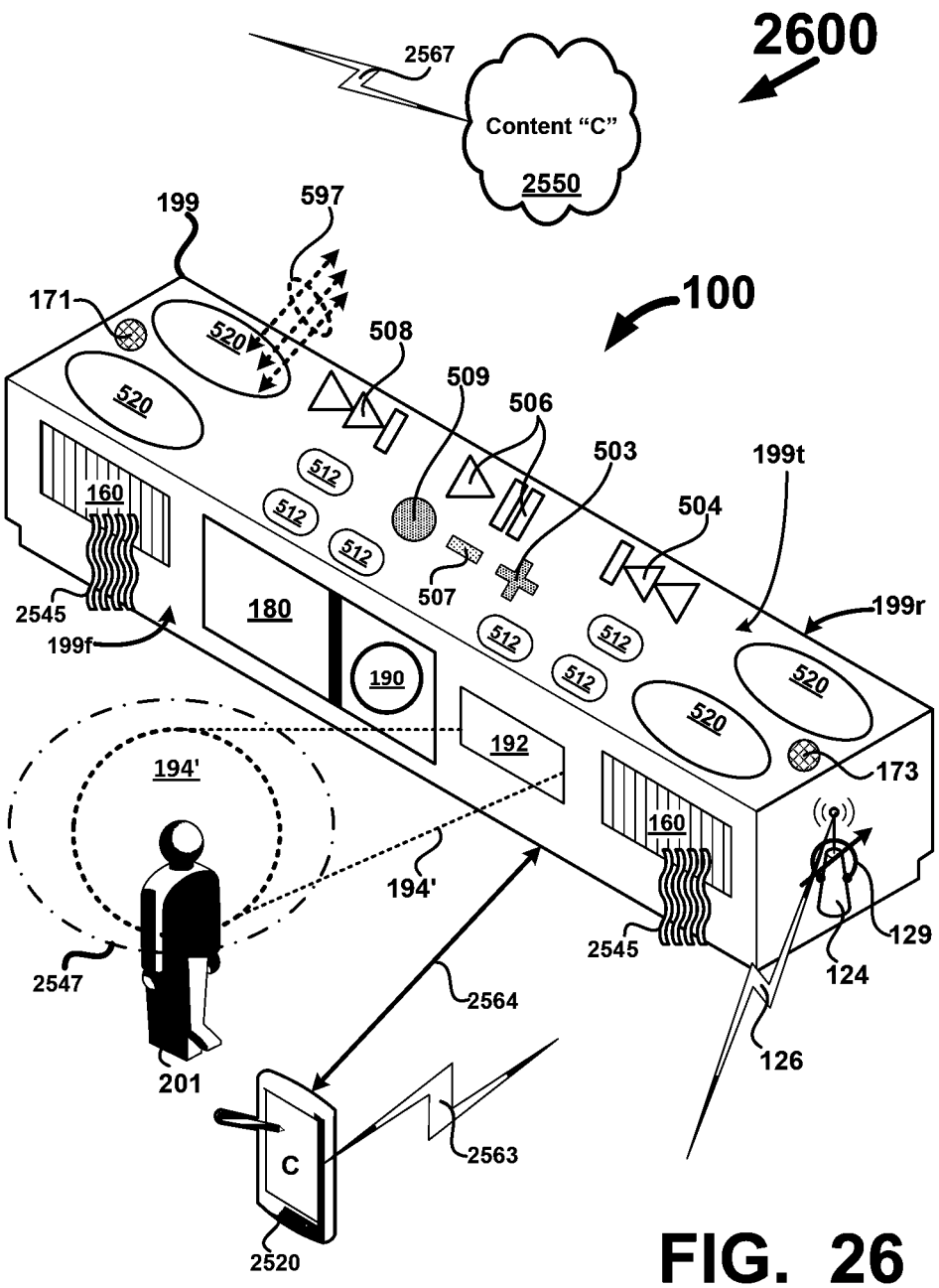

2600
2567
Content "C"
2550
199
597
171
520
520
508
509
506
503
199t
100
512
512
512
504
160
507
2545
199f
180
190
512
512
512
199r
520
520
192
173
194'
160
194'
2545
129
124
2547
2564
126
201
C
2563
2520

FIG. 26

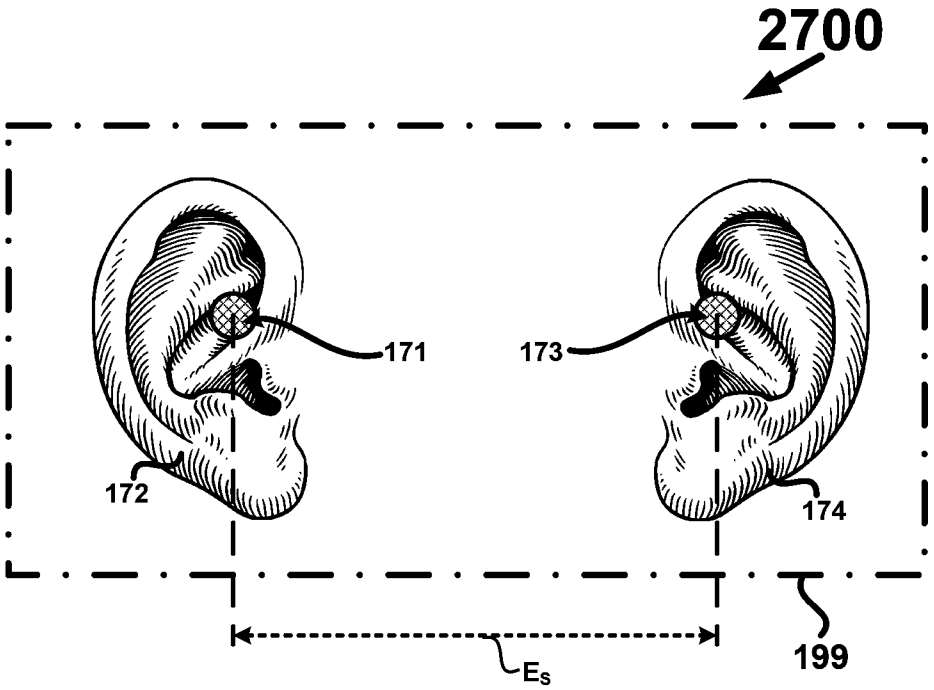


FIG. 27

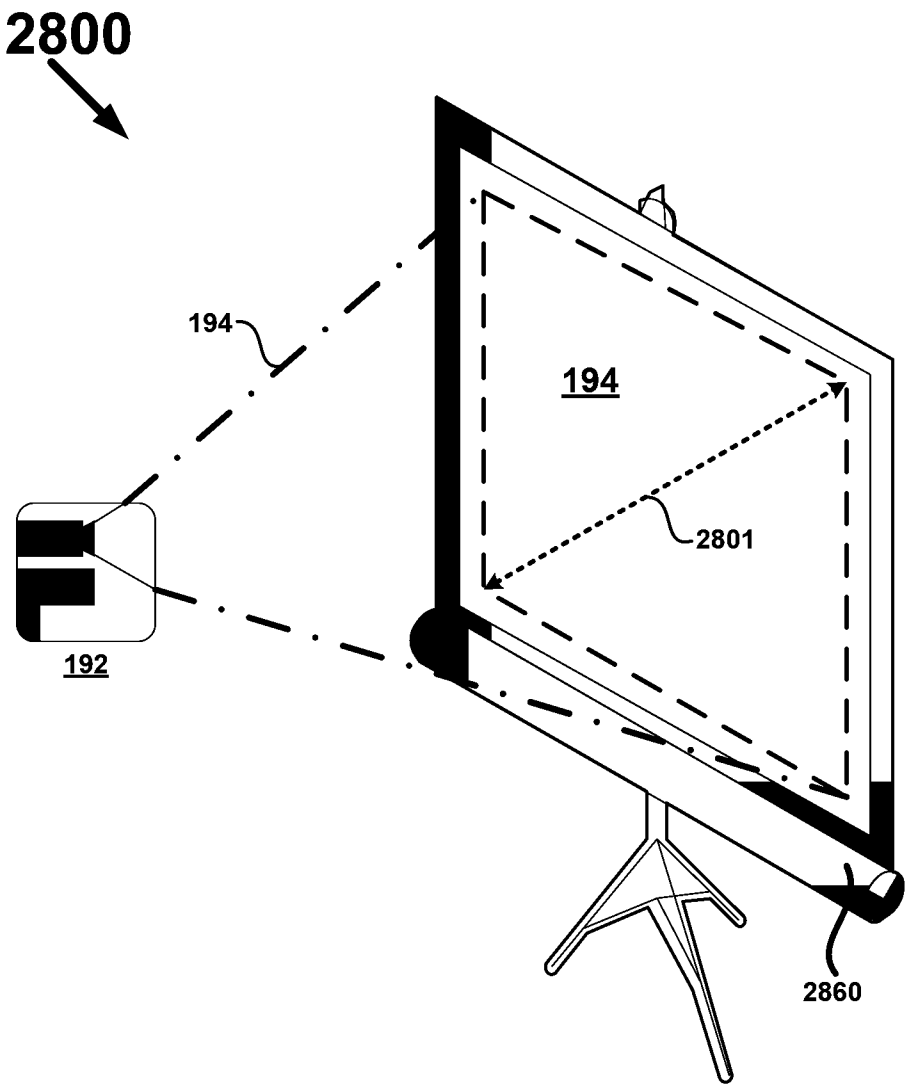


FIG. 28

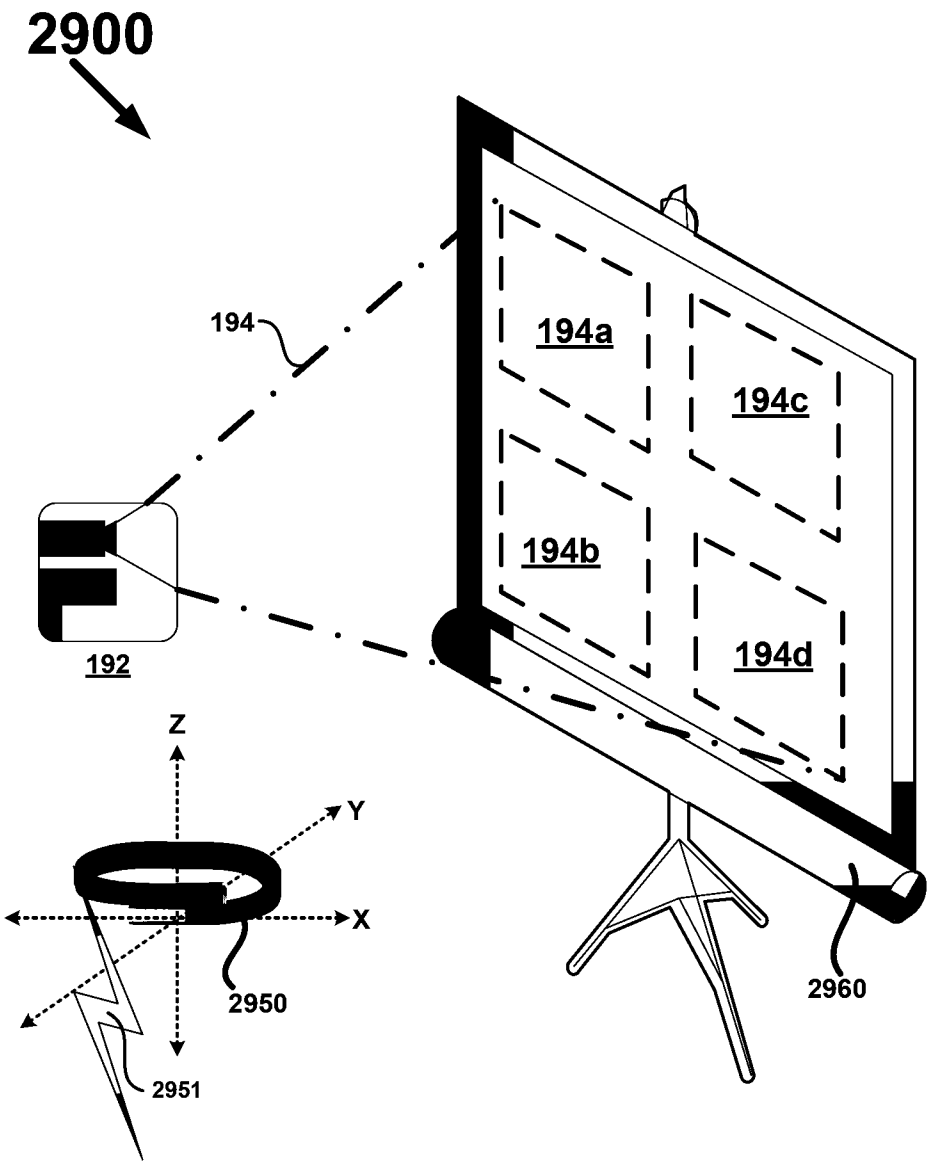


FIG. 29

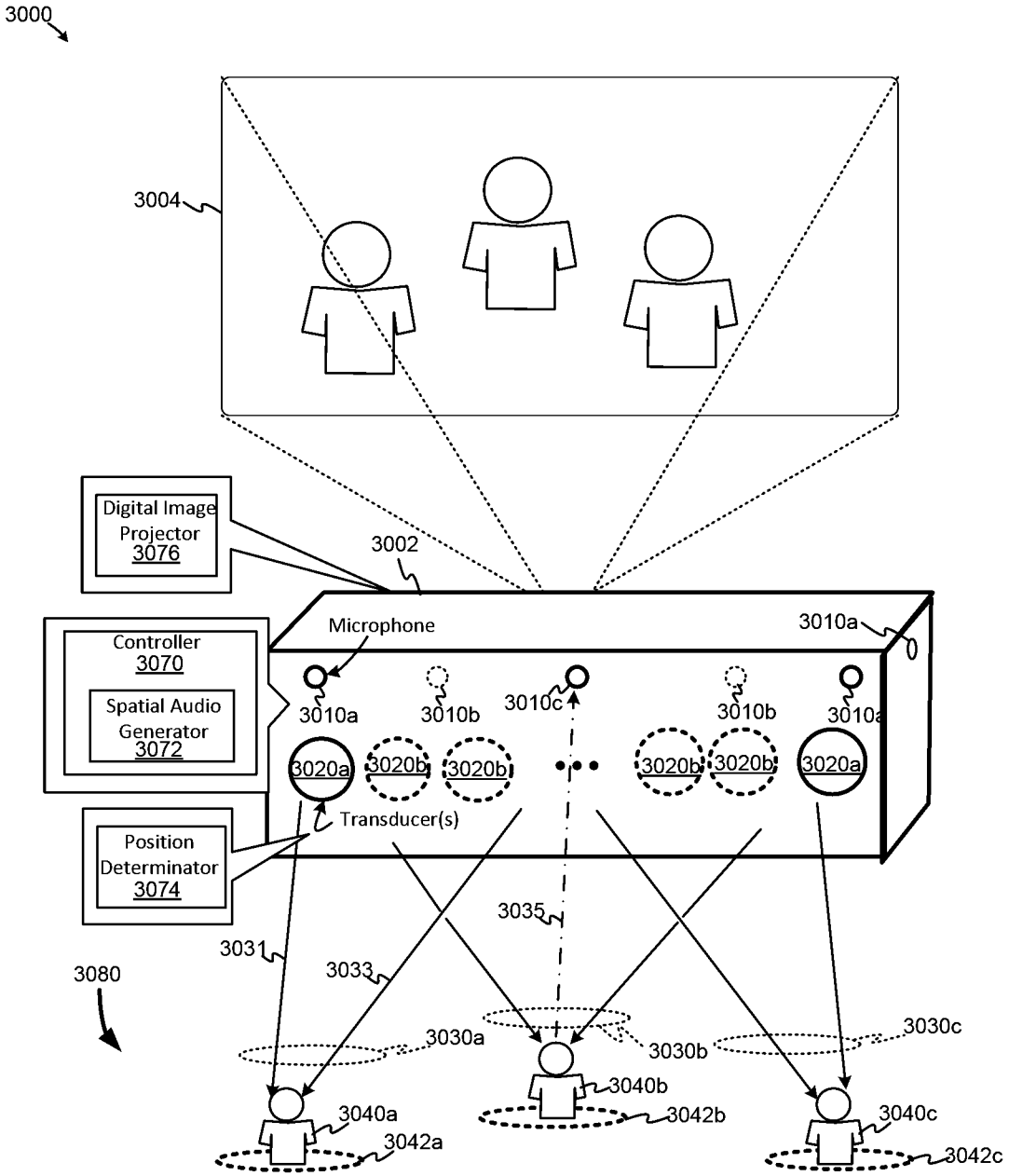

3000
3004
Digital Image Projector 3076
3002
Controller 3070
Spatial Audio Generator 3072
Microphone
3010a
3010b
3010c
3020a
3020b
Transducer(s)
Position Determinator 3074
3035
3031
3033
3080
3030a
3030b
3030c
3040a
3042a
3040b
3042b
3040c
3042c

FIG. 30

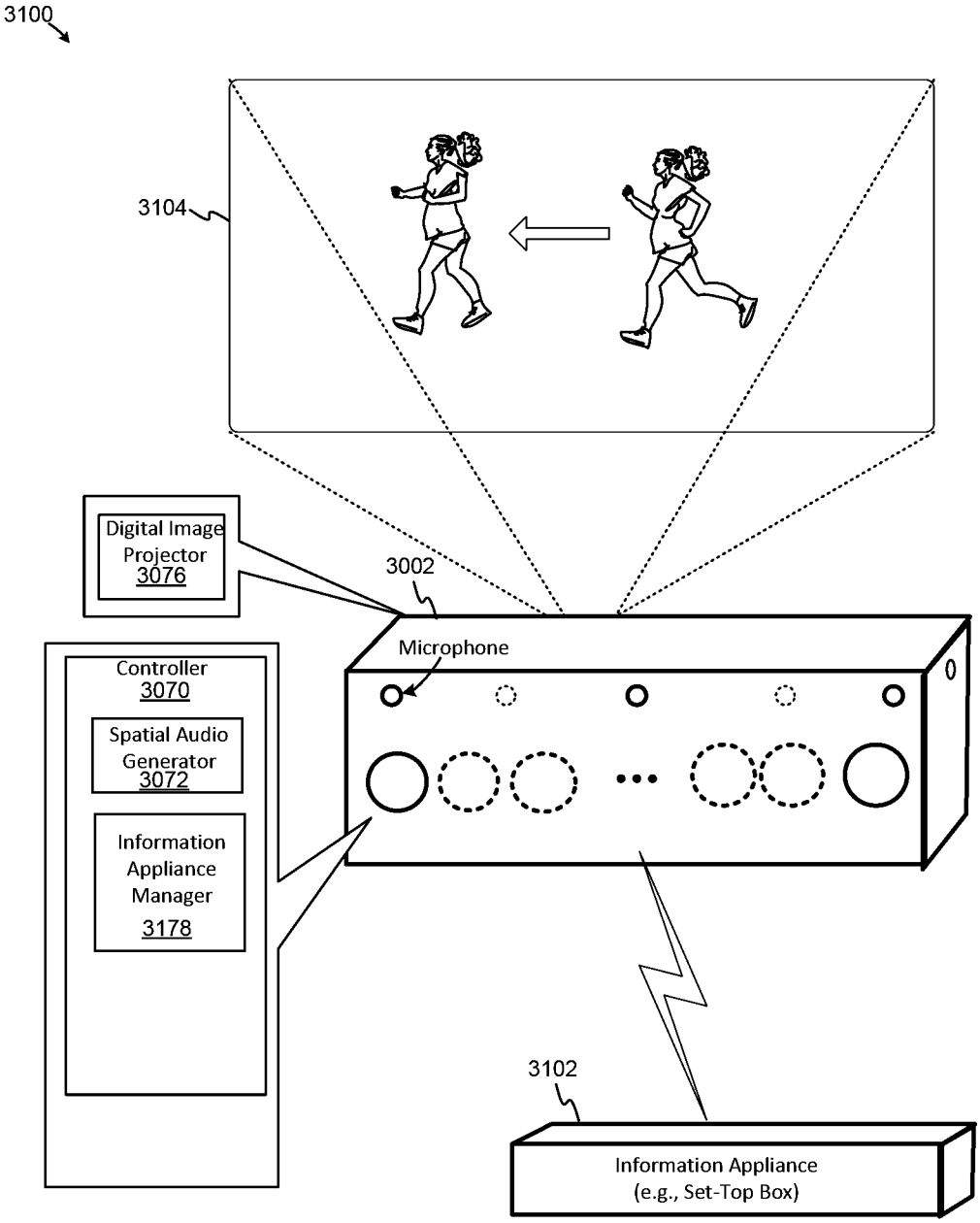

3100
3104
Digital Image Projector 3076
3002
Microphone
Controller 3070
Spatial Audio Generator 3072
Information Appliance Manager 3178
3102
Information Appliance (e.g., Set-Top Box)

FIG. 31