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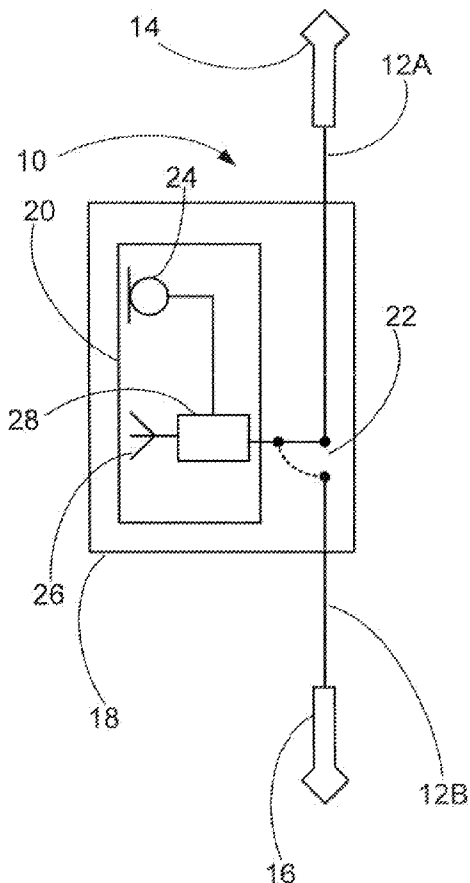
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[Continued on next page]

(54) **Title:** HEADSET AUDIO ACCESSORY



(57) **Abstract:** An audio accessory for a headset. The accessory includes a first circuit for wirelessly receiving audio signals from a first external source of audio signals, a second circuit for mechanically coupling to a second external source of audio signals for receiving the audio signals from the second external source of audio signals, controlling circuitry for controlling the relative amplitude of audio signals from the first external source and the second external source transmitted to a playback device, a connector for detachably coupling to the playback device to transmit audio signals from the controlling circuitry to the playback device, and circuitry communicatively coupling the controlling circuitry and the connector for transmitting audio signals from the controlling circuitry to the connector.

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## HEADSET AUDIO ACCESSORY

## BACKGROUND

[0001] This specification describes an audio accessory intended for use with a headphone or a headset to manage multiple sources of audio signals.

## SUMMARY

[0002] In one aspect of the invention, an audio accessory includes a first circuit for wirelessly receiving audio signals from a first external source of audio signals; a second circuit for mechanically coupling to a second external source of audio signals for receiving the audio signals from the second external source of audio signals; controlling circuitry for controlling the relative amplitude of audio signals from the first external source and the second external source transmitted to a playback device; a connector for detachably coupling to the playback device to transmit audio signals from the controlling circuitry to the playback device; and circuitry communicatively coupling the controlling circuitry and the connector for transmitting audio signals from the controlling circuitry to the connector. The second circuit may be constructed and arranged to wirelessly receive audio signals. The connector may be constructed and arranged to mate with a headset. The first external audio signal source may be a cellular telephone and the audio accessory may further include a microphone for providing voice audio signals and circuitry constructed and arranged to transmit the voice audio signals from the microphone to the cellular telephone. The microphone may be a boom microphone includes a boom assembly and the circuitry may be constructed and arranged to transmit the voice audio signals from the microphone and the connector may include circuitry integrated into the boom assembly coupling the microphone and the connector. The connector may be constructed and arranged to mechanically and electrically couple the boom microphone to a headset. The audio accessory may be configured so that the boom microphone has a retracted position and an unretracted position. In the retracted position, the boom microphone may be configured as an omnidirectional microphone and in the unretracted position, the boom microphone may be configured as a bidirectional microphone. The controlling circuitry may include a switch to select audio signals from

one of the first circuit and the second circuit, and the audio accessory may be configured so that moving the boom microphone from the retracted position to the unretracted position causes the switch to select the audio signals from the first circuit. The microphone may be a noise reducing microphone. The audio accessory may further include a cable constructed and arranged to transmit electrical power to at least one of the audio accessory, the first audio signal source and the second audio signal source. The controlling circuitry may include a switch for alternately selecting from the audio signals from the first audio signal source and audio signals from the second audio signal source for transmission to the connector. The audio accessory may further include a third circuit for receiving audio signals from a third audio signal source and the selecting circuitry may be constructed and arranged to alternatively select audio signals from the first external source, the second external source, and the third external source for transmission to the external playback device. The audio accessory may further include circuitry for pausing the operation of the external source generating the nonselected audio signals. The audio accessory may further include circuitry for communicating with a third external source of audio signals. The circuitry for communicating with a third external source of audio signals and the first circuit may share physical components. The communicatingly coupling circuitry may be an electrical cable. The audio accessory may further include circuitry for generating a side tone for transmission to the external playback device.

[0003] In another aspect of the invention, the headset assembly, includes: a headset; a accessory device for providing audio signals to the headset through a single input jack of the headset, the accessory device includes receiving circuitry for receiving audio signals from a plurality of audio signal sources, the receiving circuitry includes circuitry for wirelessly receiving audio signals from a wireless transmitter, and controlling circuitry for controlling the relative amplitude of audio signals from the plurality of audio signal sources for transmission to the headset through the single input jack. The receiving circuitry for wirelessly receiving audio signals may be constructed and arranged to receive audio signals wirelessly transmitted from a cellular telephone. The headset may further include a microphone for transducing pressure waves to voice audio signal and the accessory device may be further constructed and arranged to transmit the voice audio

signals from the microphone to the cellular telephone. The accessory device may further include a boom microphone, wherein a plug and the single input jack mechanically couple the accessory device to the headset. The accessory device may be further constructed and arranged to transmit electrical power from the headset to the receiving circuitry. The controlling circuitry may include a switch for alternatively selecting audio signals from one of the plurality of audio signal sources and another of the plurality of audio signal sources for transmission to the headset through the single input jack. The accessory device may further include circuitry for pausing the operation of the source of the nonselected audio signals.

[0004] In another aspect of the invention, a method for operating a personal audio system, includes wirelessly receiving first audio signals from a first audio signal source; receiving second audio signals from a second audio signal source; controlling the relative amplitude of the first audio signals and the second audio signals for transmission to a playback device to provide amplitude controlled first audio signals and second audio signals; and transmitting the amplitude controlled first and second audio signals through a single cable to the playback device. The receiving the second audio signals may include wirelessly receiving the second audio signals. The first audio signal source may include a cellular telephone, and the method may further include transducing pressure waves to voice audio signals and transmitting the voice audio signals to the cellular telephone. Transmitting the voice audio signals may include transmitting the voice audio signals through the single plug, jack, and cable. The method may further include providing electrical power from the playback device to at least one of circuitry for receiving the first audio signals, circuitry for receiving the second audio signals, and circuitry for controlling the relative amplitude of the first audio signals and the second audio signals. The controlling may include alternatively selecting audio signals from one of the first audio signal source and the second audio signal source for transmission to the playback device. The method may further include pausing the audio signal source providing the nonselected signals. The method may further include providing a side tone to the playback device.

[0005] In another aspect of the invention, a headset includes a headset; a accessory device for providing audio signals to the headset through a single input jack of the

headset. The accessory device includes receiving circuitry for receiving audio signals from a plurality of audio signal sources. The receiving circuitry includes circuitry for wirelessly receiving audio signals from a wireless transmitter; a switch for selecting one of receiving audio signals from the wireless transmitter and not receiving audio signals from the wireless transmitter. The headset includes a boom microphone having a first position near a user's mouth and a second position not near a user's mouth. The headset assembly is configured so that moving the boom microphone from the second position to the first position causes the switch to select receiving audio signals from the wireless transmitter. The first position may be an unretracted position and the second position may be a retracted position.

[0006] In another aspect of the invention, a headset includes a boom microphone having a first position near a user's mouth and a second position not near a user's mouth. The boom microphone may be configured as a bidirectional microphone in the first position and an omnidirectional microphone in the second position. The first position may be an unretracted position and the second position may be a retracted position.

[0007] In yet another aspect of the invention, an accessory for use with a headset, includes a boom microphone having a first position near a user's mouth and a second position not near a user's mouth and further includes a connector, for connecting the boom microphone to a device includes two selectable sources of audio signals. The boom microphone may be constructed and arranged to select one of the audio sources in the first position and the other of the audio sources in the second position. The boom microphone may be constructed and arranged to non-exclusively select one of the audio signal sources in the first position and exclusively select the other of the audio signal sources in the second position. The first position may be an unretracted position and the second position may be a retracted position.

[0008] Other features, objects, and advantages will become apparent from the following detailed description, when read in connection with the following drawing, in which:

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0009] FIGS. 1A – 1D are diagrammatic views of an audio accessory device;

[0010] FIGS. 2A -- 2D are diagrammatic views of a personal audio system including the accessory device of FIGS. 1A and 1B;

[0011] FIGS. 3A -- 3D are diagrammatic views of an audio accessory device;

[0012] FIGS. 4A and 4B are diagrammatic views of an expanded personal audio system; and

[0013] FIGS. 5A and 5B are diagrammatic views of a headset.

#### DETAILED DESCRIPTION

[0014] Though the elements of several views of the drawing may be shown and described as discrete elements in a block diagram and may be referred to as "circuitry", unless otherwise indicated, the elements may be implemented as one of, or a combination of, analog circuitry, digital circuitry, or one or more microprocessors executing software instructions. The software instructions may include digital signal processing (DSP) instructions. Unless otherwise indicated, signal lines may be implemented as discrete analog or digital signal lines, as a single discrete digital signal line with appropriate signal processing to process separate streams of audio signals, or as elements of a wireless communication system. Unless otherwise indicated, audio signals may be encoded in either digital or analog form. In this specification, an "earphone" refers to a device to fit in, on, or around an ear, typically including structure for sealing in, to, or around the ear, and including an acoustic driver to radiate acoustic energy into an earphone cavity. According to industry usage, the term "headphone" is frequently used to refer to a device including two earphones typically connected by a headband, but not including a microphone and the term "headset" refers to a device having a microphone either connected to it or as an integral part of it. Because the devices described in this specification are designed to be used with a headset or be used with a headphone to form a headset, the term "headset" is used throughout. In the several views of the drawing, some elements, such as accessory device 10, module 18, and others have different configurations in some of the views. The same reference numeral will be used throughout the specification, and the differences between the elements in the several views will be noted in the specification.

[0015] FIGS. 1A – 1D show an audio accessory device intended to be used with a headset to form elements of a personal audio system. In FIG. 1A, an accessory device 10 includes a module 18, coupled to playback device detachable connector element 14 by cable portion 12A and coupled to audio signal source detachable connector element 16 by cable portion 12B. Module 18 includes wireless communication circuitry 20 and switch 22, which alternatively couples wireless communication circuitry 20 and audio signal source detachable connector element 16 to playback device detachable connector element 14. Wireless communication circuitry 20 may include a microphone 24, antenna 26, and processing circuitry 28, which may include radio circuitry and signal processing circuitry. In FIG. 1B, cable portion 12B and audio signal source detachable connector element 16 of FIG. 1A are replaced by wireless communication circuitry 20'. In FIG. 1C, the microphone 24 is absent so that accessory device 10 has no microphone. In devices using the configuration of FIG. 1C, there may be a microphone as a part of another component of a personal audio system, as will be described below. In the implementation of FIG. 1D, switch 22 is replaced by circuitry including amplifier 48 coupled to audio signal source detachable connector element 16 and to summer 52, which is coupled to playback device detachable connector element 14. Amplifier 48 may also be coupled to processing circuitry 28. The audio accessory device may include other amplifiers, which are not shown.

[0016] FIGS. 2A – 2C show one of the accessory devices 10 of FIGS 1A and 1C as a component of various configurations of a personal audio system, illustrating how the accessory device functions. In FIG. 2A, playback device detachable connector element 14 (not shown in this view) is detachably mated with an input jack of headset 32. Wireless communication circuitry 20 is constructed and arranged to communicate wirelessly with cellular telephone 30. Audio signal source detachable connector element 16 (not shown in this view) is detachably mated with an output jack of audio signal source 34. Optional control line 29 may couple processing circuitry 28 and audio signal source 34. FIG. 2B shows the microphoneless accessory device 10 of FIG. 1C mated with the input jack of a headset 32 equipped with a microphone, such as a boom microphone 44. In the configuration of FIG. 2B, detachable connector element 14 (not identified in this view) and cable portion 12A are configured to transmit the audio signal from the



boom microphone 44 to wireless communication circuitry 20. In the implementation of FIG. 2C, boom microphone 44 is a component of accessory device 10. Playback device detachable connector element 14 may couple, electrically and mechanically, boom microphone 44 and module 18 to headset 32 via a jack in headset 32.

[0017] Referring to FIG. 2D, the operation of the accessory device will be described using the configuration of FIG. 2A, it being understood that the configuration of FIGS. 2B and 2C may function in a similar manner. In normal operation, accessory device 10 transmits to headset 32 audio signals from external audio signal source 34 as shown in FIG. 2A. If an audio signal transmission is received by wireless communication circuitry 20 from an external audio signal source such as cellular phone 30 (as indicated by wireless transmission symbols 31 and remote wireless transmission device 33 of FIG. 2D), the position of switch 22 is changed, as shown in FIG. 2D, so that signals from wireless communication circuitry 20 are transmitted to headset 32, causing microphone 24 and headset 32 to act as components of a "hands free" cellular telephone system. Prior to the changing of the position of switch 22, the accessory device may transmit a control signal over optional control line 29 to the audio signal source 34 to pause the transmission of audio signals from audio signal source 34 to headset 32. When the communication from cellular telephone 30 to wireless communication circuitry is terminated, the position of switch may change so that audio signals may resume being transmitted from audio signal source 34 to headset 32. If necessary, a control signal may be transmitted to audio signal source 34 over optional control line 29 to un-pause the transmission of audio signals from audio signal source 34 to headset 32 so that the musical piece that the user was listening to resumes from the same point in the musical piece as it was prior to the pause. If cellular telephone 30 does not generate a side tone, wireless communication circuitry 20 may be constructed and arranged to generate the side tone. A side tone is an audio signal proportional to the microphone signal that is transmitted to the headset 32 to allow the user to hear through the headset 32, what the user says. A side tone is especially desirable if the headset 32 is a high performance passive or active noise reduction headset. In a high performance noise reduction headset, the attenuation of the user's own voice may result in the user not being able to hear him/her self well, which seems unnatural or uncomfortable. If the side tone is not

provided locally (for example if the side tone is provided by transmitting from microphone 24 to cellular telephone 30, from cellular telephone 30 to processing circuitry 28 to headset 32 using a compressed wireless link), the delay may be annoying. If a side tone is generated it is desirable for microphone 24 to be a noise reducing microphone (for example a bi-directional microphone located in close proximity to the mouth) so that the side tone does not include ambient noise that the noise reducing headset is designed to attenuate. If the implementations of FIGS. 2A – 2D are implemented with the accessory device of FIG. 1D, a user of headset 32 could hear both sound transmitted through wireless communication circuitry 20 and sound corresponding to audio signals from audio signal source 34, as indicated by the mixing of the audio signals at summer 52 of FIG. 1D. Optionally, a person conversing with the headset user over the wireless communication circuitry 20 could hear both sound from the headset user and sound corresponding to signals from audio signal source 34. The gain G of amplifier 48 of FIG. 1D can be controllable to permit the user of the headset to control the relative amount of sound from the wireless communication circuitry and sound from the audio signal source 34 and optionally to control the relative amount of sound from the microphone 24 and the sound from the audio signal source 34 as indicated by signal line 35. If the gain G of amplifier 48 of FIG. 1D is zero when there is transmission from wireless communications circuitry 20 and unity when there is no transmission from wireless communications circuitry 20, an audio accessory device of FIG. 1D functions equivalently to the audio accessory device of FIG. 1A. In another alternative, the function of switch 22 could be implemented as muting circuitry that, in the event of transmission from wireless communications circuitry 20, mutes the input from audio signal source 34.

**[0018]** In one embodiment, cable portions 12A and 12B may be conventional stereo audio cable. Playback device detachable connector element 14 and audio signal source detachable connector element 16 may be a plug constructed and arranged to mate with a 3.5 mm stereo jack to detachably couple the accessory device 10 to playback device such as headset 32 or to an external music source 34, respectively. Module 18 may be implemented as a so-called “dongle” between cable portions 12A and 12B. Antenna 26 and processing circuitry 28 may be conventional elements associated with wireless “hands free” devices for cell phone systems. Cell phone 30 may be a conventional cell

phone adapted to transmit wirelessly according to voice bandwidth hands-free profile (HFP) or the headset profile (HSP) of the Bluetooth wireless communications standard defined by the Bluetooth Special Interest Group (SIG), available at URL address [www.bluetooth.org](http://www.bluetooth.org). For purposes of explanation, switch 22 is shown as a two position switch. In some implementations, switch 22 may be implemented as a suitably programmed digital signal processing (DSP) device so that, for example, control signals can be communicated between processing circuitry 20 and audio signal device 34 as discussed in the description of the function of control line 29, so that control line 29 can be integrated into cable portion 12B, and so that the implementations of FIGS. 1A – 1C can be implemented with the same components as the implementation of FIG. 1D. In other implementations, switch 22 may be implemented as a manually or electronically controllable analog switch. Audio signal source 34 may be an MP3 player, such as an iPod® mobile digital device manufactured by Apple Corporation of Cupertino, CA, or a CD player, or a jack of an audio system of an airplane, or others. Headset 32 may be one of a wide variety of devices, such as a single earbud “hands free” cell phone headset; an interaural, circumaural, or supra-aural stereo passive or active noise reduction headset; or a communications headset; or the like.

[0019] FIGS. 3A – 3D show the accessory device 10 of FIG. 1A with an additional feature. The device of FIG. 3A has the components of FIG. 1A, and in addition has a power cable 36, with suitable connectors, such as detachable connector elements 38 and 40 at the two ends. In operation, detachable connector element 38 may be inserted into a power input/output jack of audio signal source 34 and detachable connector element 40 may be inserted into a power output/input of headset 32. The accessory device of FIG. 3A permits headset 32 to supply power to audio signal source 34 or permits audio signal source 34 to supply power to headset 32 and permits audio signal source 34 (of FIGS. 2A – 2D) or headset 32 (of FIGS. 2A – 2D) to supply power for the electronic components of the audio accessory device 10. If audio signal source 34 and headset 32 each have their own power source, the electronic components of the audio accessory device 10 may be powered by the headset 32, as shown in FIG. 3B, or may be powered by the audio signal source 34, as shown in FIG. 3C. For clarity of explanation, detachable connector elements 14, 16, 38, and 40 are shown as separate elements. In an actual implementation,

detachable connector elements 14 and 40 and detachable connector elements 16 and 38 can be combined in a single plug. Power from the headset and audio source can be managed using the devices and techniques described in U.S. Pat. App. 11/191,873. Power cable 36 may be physically integrated with cable portions 12A and 12B. Alternatively, the audio accessory may be powered by an internal battery 42, as shown in FIG. 3D. The configurations of FIGS. 3A -- 3D can also be implemented with the microphoneless wireless communication circuitry 20C of FIGS. 1C or 1C.

[0020] An accessory device 10 according to FIGS. 1 -- 3 is advantageous over conventional auxiliary input devices because it requires a headset with only one input jack; because it can be adapted to be used with any headset with an input jack; because it allows the user great flexibility in the selection of a cellular telephone component, an audio signal source component, and a headset component of a personal audio system; and because it can be used with a headset that does not contain wireless communications circuitry or circuitry to select between audio signal sources. An accessory device that generates a side tone avoids the unnatural and uncomfortable sensation that may occur when the active or passive noise reduction attenuates the user's own voice and avoids the delay that may result from the transmission of voice signals over a compressed wireless link such as a Bluetooth link.

[0021] Referring now to FIGS. 4A and 4B, there is shown an expanded personal audio system. The systems of FIGS. 4A and 4B have the elements of FIG. 2B and in addition circuitry for communicating with a third source of audio signals. FIG. 4A includes, for example second wireless communication circuitry 20', which could be for communicating in a wireless intercom network separate from the cell phone network. FIG. 4B includes an additional cable 12C and detachable connector element 16 (not shown in this view) for electrically and mechanically connecting with an external device 46, which could be, for example, a wired local communications system in a building, ship or airliner. The expansion to accommodate the third source of audio signals can be easily done by modification to circuitry in the module 18 such as the switch 22 and does not require redesign of the physical circuitry or the structure of the headset (such as adding additional input jacks). For explanatory purposes, second wireless communications circuitry 20' is shown as distinct from wireless communications circuitry 20. In an actual

implementation, wireless communications circuitry 20 and second wireless communications circuitry 20' may share physical components, such as antenna 26. In some implementations, second wireless communications circuitry 20 may be implemented as DSP instructions operating on wireless communications circuitry 20.

[0022] Referring to FIGS. 5A and 5B, there is shown an additional optional feature of the audio device. A headset 32 is mechanically coupled to microphone 44 by a boom 54. The microphone may be a bi-directional microphone with two opposed ports 56 and 58. In FIG. 5A, boom 54 is positioned so that the microphone is near the user's mouth, for example within 4cm of the corner of the mouth. In FIG. 5B, boom 54 is positioned so that microphone 44 is not near the user's mouth, for example more than 5cm from the corner of the mouth. Microphone 44 may be configured so that in the position of FIG. 5B with the microphone not near the user's mouth, one of the ports 58 is covered so that microphone 44 is an omnidirectional microphone.

[0023] Providing the two positions for the boom microphone can be done in a number of ways, for example by hinging the boom or by making boom 54 to be retractable. Boom 54 can be made retractable in a number of ways. For example, it can be made to retract into earphone 60, into an accessory boom mounting structure attached to earphone 60, and it can include telescoping sections. In the discussion following, the position near the user's mouth and the position not near the user's mouth are done by making the boom retractable. The features discussed below can also be done by, for example, hinging the boom.

[0024] The retraction mechanism can be integrated with circuitry constructed and arranged so that the act of moving the microphone from the position of FIG. 5B to the position of FIG. 5A causes wireless communications circuitry 20 to answer a call from cellular telephone 30. The boom microphone can be used in a similar manner with audio signal source equipped cell phones that store audio signals in some format (such as the MP3 format) and which also function as cell phones. The circuitry may be constructed and arranged so that the act of moving the microphone from the unretracted position of FIG. 5A to the retracted position of FIG. 5B the circuitry disconnects from a cell phone call or causes the audio source equipped cell phone to act exclusively as an audio signal

source or both. The act of moving the microphone from the retracted position of FIG. 5B to the unretracted position of FIG. 5A answers a cell phone call and /or pauses the transmission from the audio source, and causes the audio source equipped cell phone to operate as a cell phone, with the boom microphone providing voice input to the cell phone. In this configuration, the audio signal source equipped cell phone operates either exclusively as a cell phone, or operates as a cell phone in combination with operating as an audio signal source so that the user can hear both transmissions from the cell phone and music corresponding to the audio signals on the audio signal source. The boom microphone may also be configured so that in the retracted position, one of the ports 58 of FIG. 5A of the bi-directional microphone may be covered, as shown in FIG. 5B so that the microphone is an omnidirectional microphone. In the position of FIG. 5A, the microphone can be used in high noise environments to produce a good speech-to-noise ratio and in the position of FIG. 5B, the microphone can be in a less conspicuous, less distracting, location relative to the user when being used in a low noise environment.

Numerous uses of and departures from the specific apparatus and techniques disclosed herein may be made without departing from the inventive concepts. Consequently, the invention is to be construed as embracing each and every novel feature and novel combination of features disclosed herein and limited only by the spirit and scope of the appended claims.

What is claimed is:

- 1 1. An audio accessory comprising:  
2 a first circuit for wirelessly receiving audio signals from a first external source of  
3 audio signals;  
4 a second circuit for mechanically coupling to a second external source of audio  
5 signals for receiving the audio signals from the second external source of audio signals;  
6 controlling circuitry for controlling the relative amplitude of audio signals from  
7 the first external source and the second external source transmitted to a playback device;  
8 a connector for detachably coupling to the playback device to transmit audio  
9 signals from the controlling circuitry to the playback device; and  
10 circuitry communicatively coupling the controlling circuitry and the connector for  
11 transmitting audio signals from the controlling circuitry to the connector.
- 1 2. An audio accessory in accordance with claim 1, wherein the second circuit is  
2 constructed and arranged to wirelessly receive audio signals.
- 1 3. An audio accessory in accordance with claim 1, wherein the connector is  
2 constructed and arranged to mate with a headset.
- 1 4. An audio accessory in accordance with claim 1, wherein the first external audio  
2 signal source is a cellular telephone, the audio accessory further comprising  
3 a microphone for providing voice audio signals and circuitry constructed and  
4 arranged to transmit the voice audio signals from the microphone to the cellular  
5 telephone.
- 1 5. An audio accessory in accordance with claim 4, wherein  
2 the microphone is a boom microphone comprising a boom assembly;  
3 the circuitry constructed and arranged to transmit the voice audio signals from the  
4 microphone and the connector comprises circuitry integrated into the boom assembly  
5 coupling the microphone and the connector; and  
6 the connector is constructed and arranged to mechanically and electrically couple  
7 the boom microphone to a headset.

1 6. An audio accessory in accordance with claim 5, wherein the audio accessory is  
2 configured so that the boom microphone has a retracted position and an unretracted  
3 position.

1 7. An audio accessory in accordance with claim 6, wherein, in the retracted position,  
2 the boom microphone is configured as an omnidirectional microphone and in the  
3 unretracted position, the boom microphone is configured as a bidirectional microphone.

1 8. An audio accessory in accordance with claim 5, the controlling circuitry  
2 comprising a switch to select audio signals from one of the first circuit and the second  
3 circuit, and wherein the audio accessory is configured so that moving the boom  
4 microphone from the retracted position to the unretracted position causes the switch to  
5 select the audio signals from the first circuit

1 9. An audio accessory in accordance with claim 4, wherein the microphone is a  
2 noise reducing microphone.

1 10. An audio accessory in accordance with claim 1, further comprising a cable  
2 constructed and arranged to transmit electrical power to at least one of the audio  
3 accessory, the first audio signal source and the second audio signal source.

1 11. An audio accessory in accordance with claim 1, wherein the controlling circuitry  
2 comprises a switch for alternately selecting from the audio signals from the first audio  
3 signal source and audio signals from the second audio signal source for transmission to  
4 the connector.

1 12. An audio accessory in accordance with claim 11, further comprising a third circuit  
2 for receiving audio signals from a third audio signal source, wherein the selecting  
3 circuitry is constructed and arranged to alternatively select audio signals from the first  
4 external source, the second external source, and the third external source for transmission  
5 to the external playback device.

1 13. An audio accessory in accordance with claim 11, further comprising circuitry for  
2 pausing the operation of the external source generating the nonselected audio signals.

1 14. An audio accessory in accordance with claim 1, further comprising circuitry for  
2 communicating with a third external source of audio signals.



1 15. An audio accessory in accordance with claim 14, wherein the circuitry for  
2 communicating with a third external source of audio signals and the first circuit share  
3 physical components.

1 16. An audio accessory in accordance with claim 1, wherein the communicatingly  
2 coupling circuitry is an electrical cable.

1 17. An audio accessory in accordance with claim 1, further comprising circuitry for  
2 generating a side tone for transmission to the external playback device.

1 18. A headset assembly, comprising:  
2 a headset;  
3 a accessory device for providing audio signals to the headset through a single  
4 input jack of the headset, the accessory device comprising  
5 receiving circuitry for receiving audio signals from a plurality of audio signal  
6 sources, the receiving circuitry comprising circuitry for wirelessly receiving audio signals  
7 from a wireless transmitter, and  
8 controlling circuitry for controlling the relative amplitude of audio signals from  
9 the plurality of audio signal sources for transmission to the headset through the single  
10 input jack.

1 19. A headset assembly in accordance with claim 18, wherein the receiving circuitry  
2 for wirelessly receiving audio signals is constructed and arranged to receive audio signals  
3 wirelessly transmitted from a cellular telephone.

1 20. A headset assembly in accordance with claim 19, the headset further comprising a  
2 microphone for transducing pressure waves to voice audio signal, the accessory device  
3 further constructed and arranged to transmit the voice audio signals from the microphone  
4 to the cellular telephone.

1 21. A headset assembly in accordance with claim 19, the accessory device further  
2 comprising a boom microphone, wherein a plug and the single input jack mechanically  
3 couple the accessory device to the headset.

1 22. A headset assembly in accordance with claim 18, wherein the accessory device is  
2 further constructed and arranged to transmit electrical power from the headset to the  
3 receiving circuitry.

1 23. A headset assembly in accordance with claim 18, wherein the controlling circuitry  
2 comprises a switch for alternatively selecting audio signals from one of the plurality of  
3 audio signal sources and another of the plurality of audio signal sources for transmission  
4 to the headset through the single input jack.

1 24. A headset assembly in accordance with claim 23, the accessory device further  
2 including circuitry for pausing the operation of the source of the nonselected audio  
3 signals.

1 25. A method for operating a personal audio system, comprising:  
2 wirelessly receiving first audio signals from a first audio signal source;  
3 receiving second audio signals from a second audio signal source;  
4 controlling the relative amplitude of the first audio signals and the second audio  
5 signals for transmission to a playback device to provide amplitude controlled first audio  
6 signals and second audio signals; and  
7 transmitting the amplitude controlled first and second audio signals through a  
8 single cable to the playback device.

1 26. A method for operating a personal audio system in accordance with claim 25,  
2 wherein the receiving the second audio signals comprises wirelessly receiving the second  
3 audio signals.

1 27. A method for operating a personal audio system in accordance with claim 25,  
2 wherein the first audio signal source comprises a cellular telephone, the method further  
3 comprising  
4 transducing pressure waves to voice audio signals; and  
5 transmitting the voice audio signals to the cellular telephone.

1 28. A method for operating a personal audio system in accordance with claim 27,  
2 wherein transmitting the voice audio signals comprises transmitting the voice audio  
3 signals through the single plug, jack, and cable.

1 29. A method for operating a personal audio system in accordance with claim 25,  
2 further comprising  
3 providing electrical power from the playback device to at least one of circuitry for  
4 receiving the first audio signals, circuitry for receiving the second audio signals, and  
5 circuitry for controlling the relative amplitude of the first audio signals and the second  
6 audio signals.

1 30. A method for operating a personal audio system in accordance with claim 25,  
2 wherein the controlling comprises alternatively selecting audio signals from one of the  
3 first audio signal source and the second audio signal source for transmission to the  
4 playback device.

1 31. A method for operating a personal audio system in accordance with claim 30,  
2 further comprising pausing the audio signal source providing the nonselected signals.

1 32. A method for operating a personal audio system in accordance with claim 25,  
2 further comprising providing a side tone to the playback device.

1 33. A headset, comprising:  
2 a headset;  
3 a accessory device for providing audio signals to the headset through a single  
4 input jack of the headset, the accessory device comprising  
5 receiving circuitry for receiving audio signals from a plurality of audio signal  
6 sources, the receiving circuitry comprising circuitry for wirelessly receiving audio signals  
7 from a wireless transmitter;

8 a switch for selecting one of receiving audio signals from the wireless transmitter  
9 and not receiving audio signals from the wireless transmitter;

10 the headset comprising a boom microphone having a first position near a user's  
11 mouth and a second position not near a user's mouth, wherein the headset assembly is  
12 configured so that moving the boom microphone from the second position to the first  
13 position causes the switch to select receiving audio signals from the wireless transmitter.

1 34. A headset in accordance with claim 33, wherein the first position is an unretracted  
2 position and the second position is a retracted position.

- 1 35. A headset, comprising:  
2 a boom microphone having a first position near a user's mouth and a second  
3 position not near a user's mouth, wherein the boom microphone is configured as a  
4 bidirectional microphone in the first position and an omnidirectional microphone in the  
5 second position.
- 1 36. A headset in accordance with claim 35, wherein the first position is an unretracted  
2 position and the second position is a retracted position.
- 1 37. An accessory for use with a headset, comprising:  
2 a boom microphone having a first position near a user's mouth and a second  
3 position not near a user's mouth;  
4 a connector, for connecting the boom microphone to a device comprising two  
5 selectable sources of audio signals;  
6 wherein the boom microphone is constructed and arranged to select one of the  
7 audio sources in the first position and the other of the audio sources in the second  
8 position.
- 1 38. An accessory in accordance with claim 37, wherein the boom microphone is  
2 constructed and arranged to non-exclusively select one of the audio signal sources in the  
3 first position and exclusively select the other of the audio signal sources in the second  
4 position.
- 1 39. An accessory in accordance with claim 37, wherein the first position is an  
2 unretracted position and the second position is a retracted.

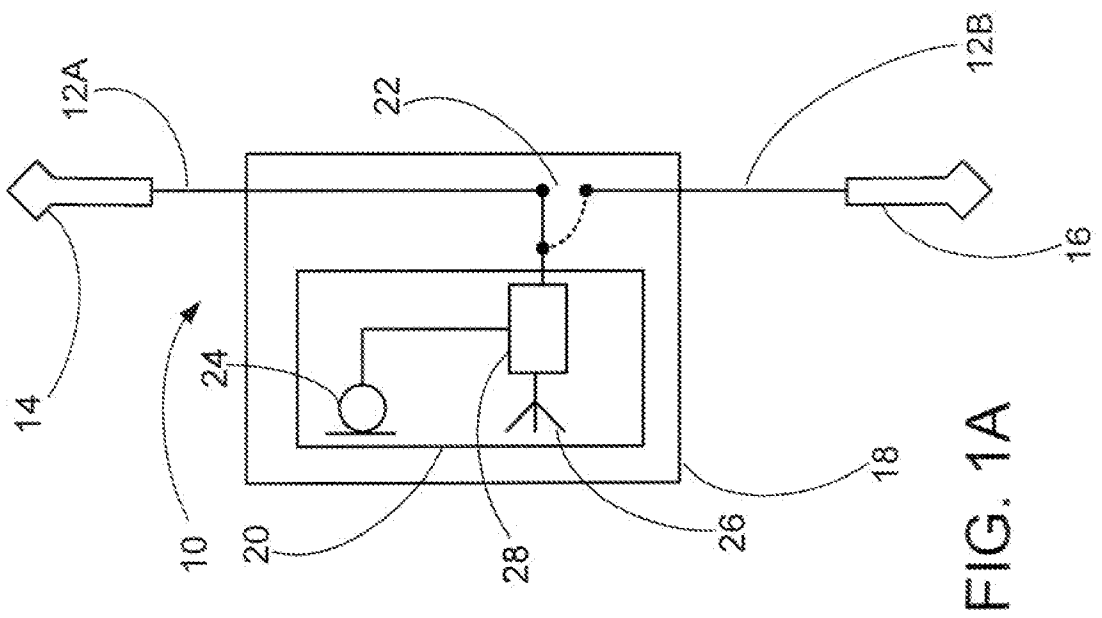
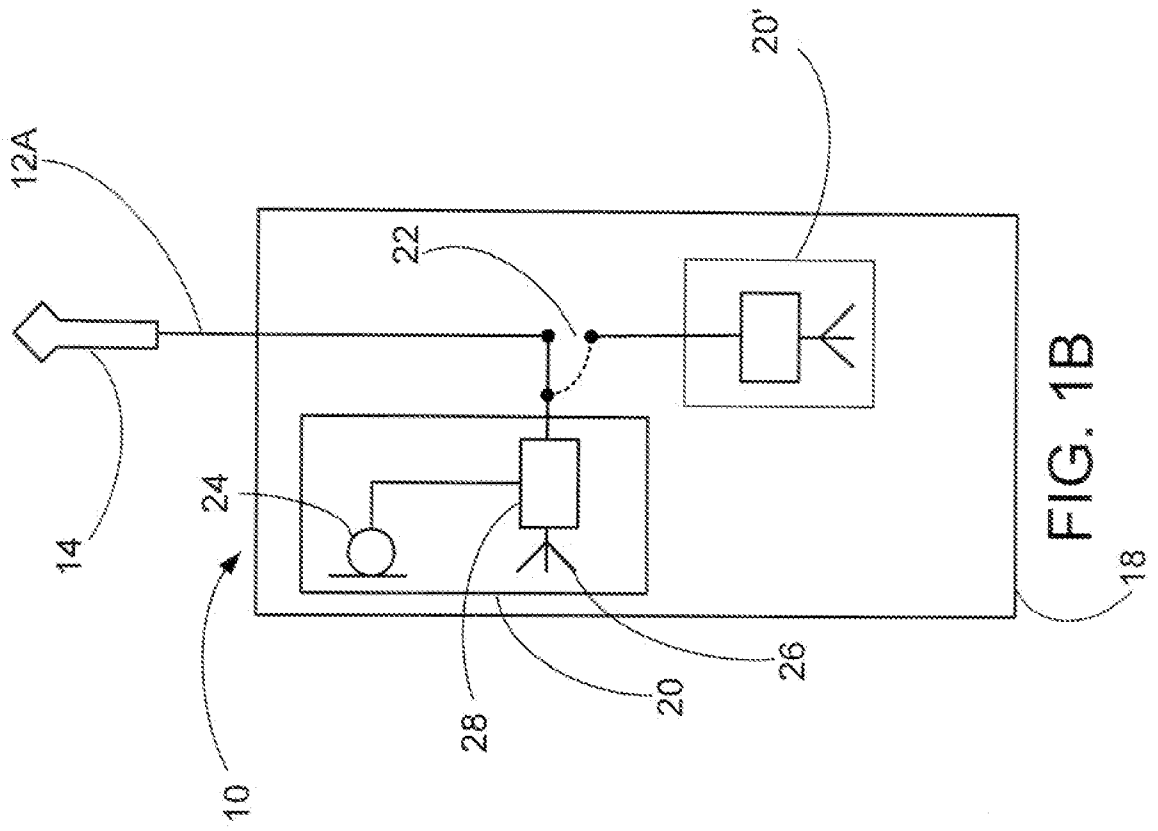
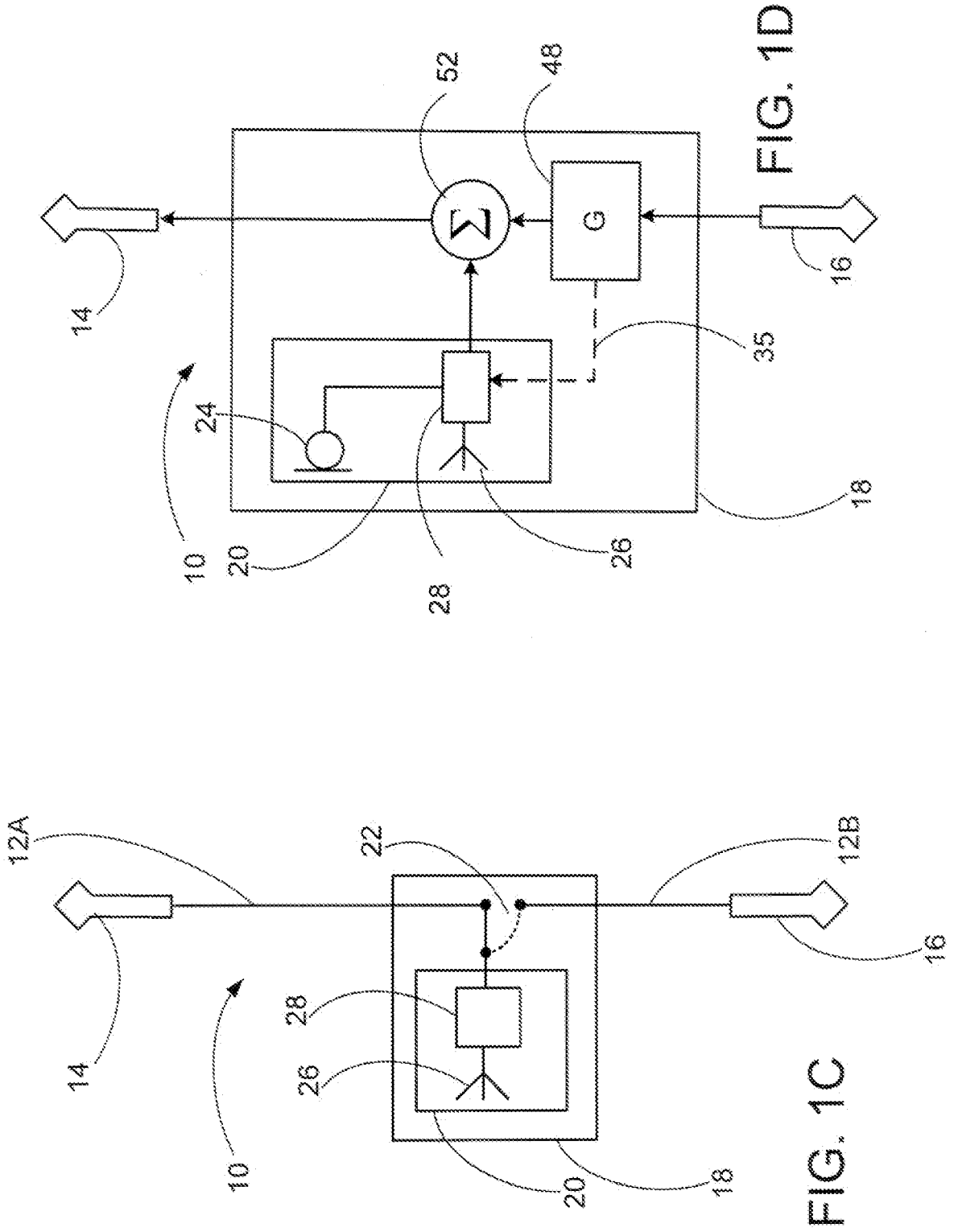


FIG. 1A

FIG. 1B



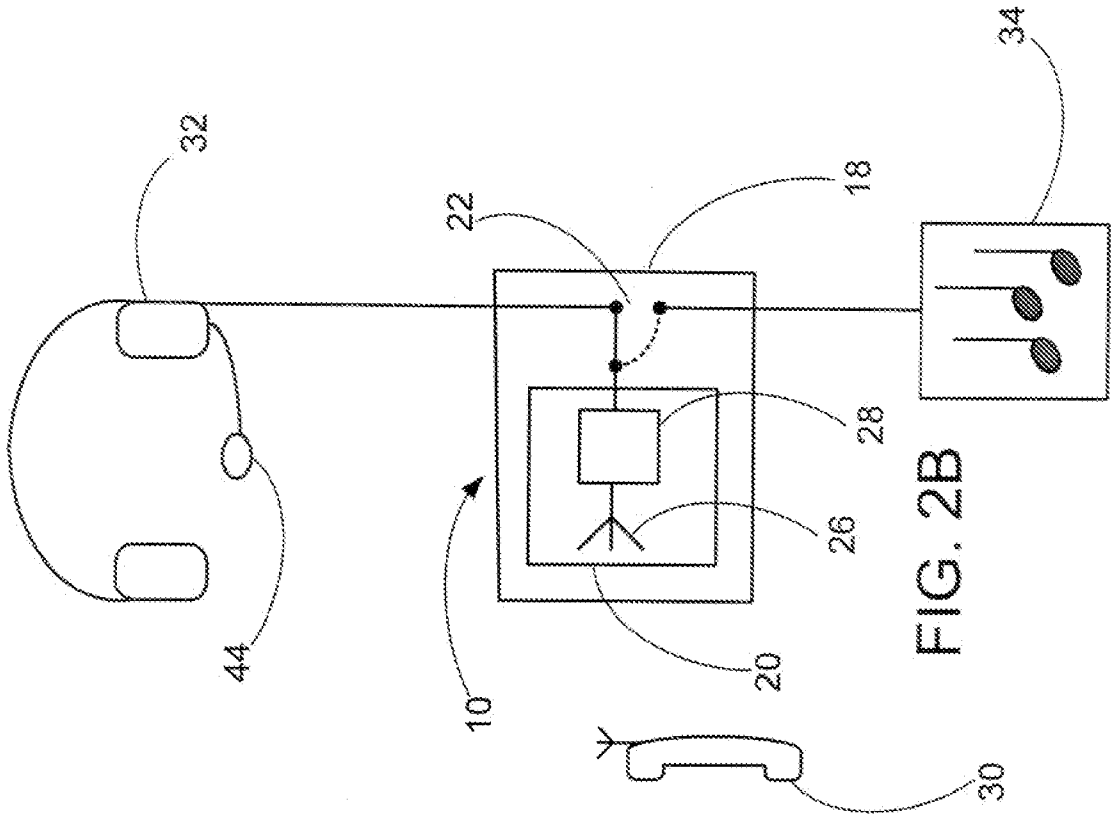


FIG. 2B

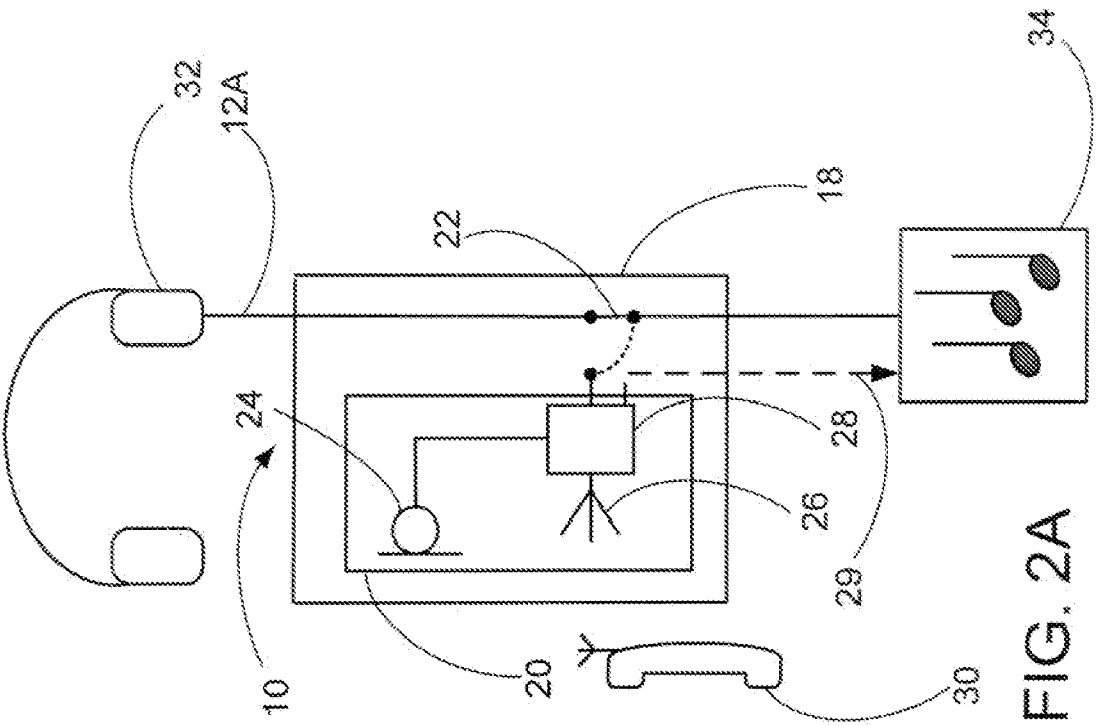


FIG. 2A

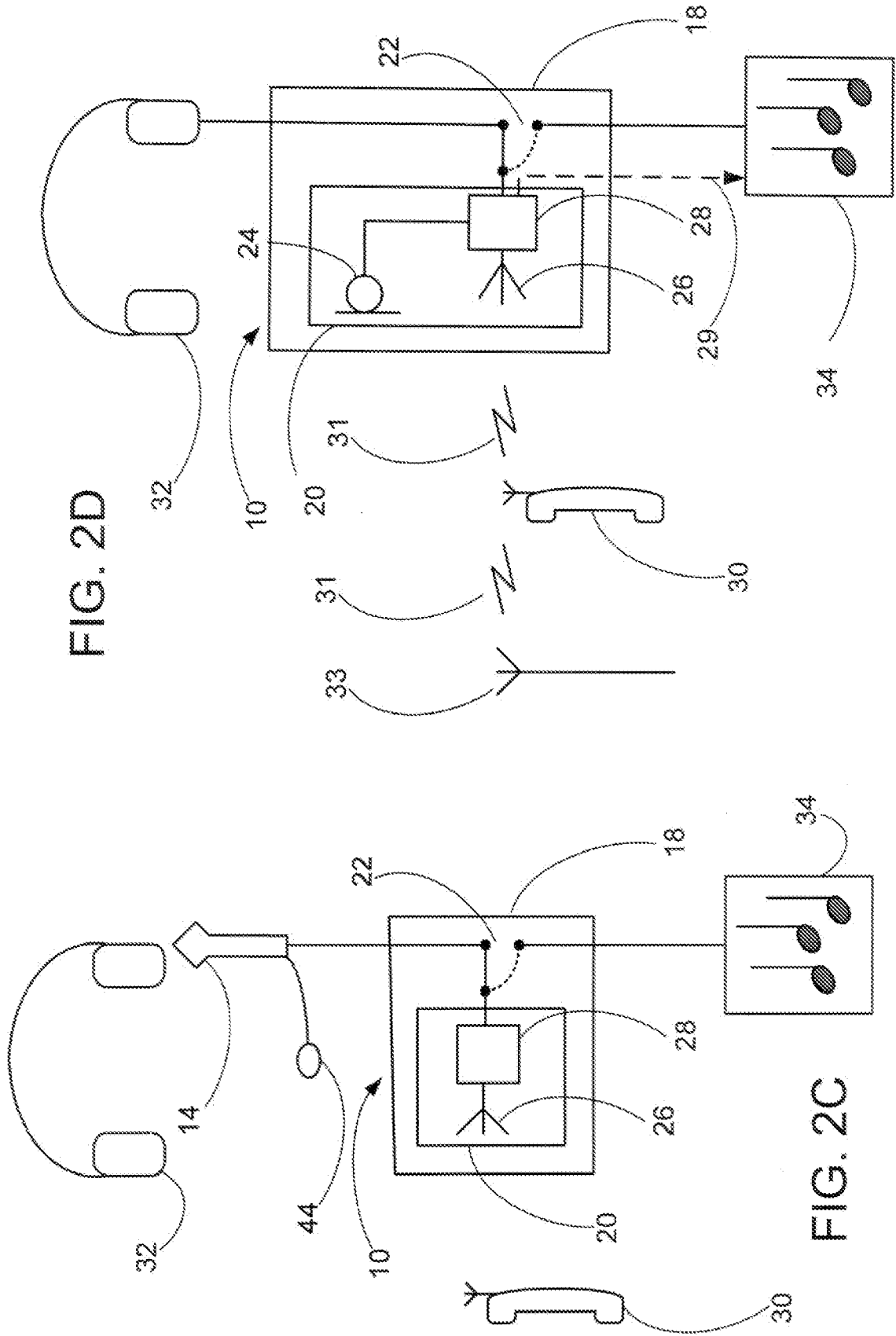


FIG. 2D

FIG. 2C



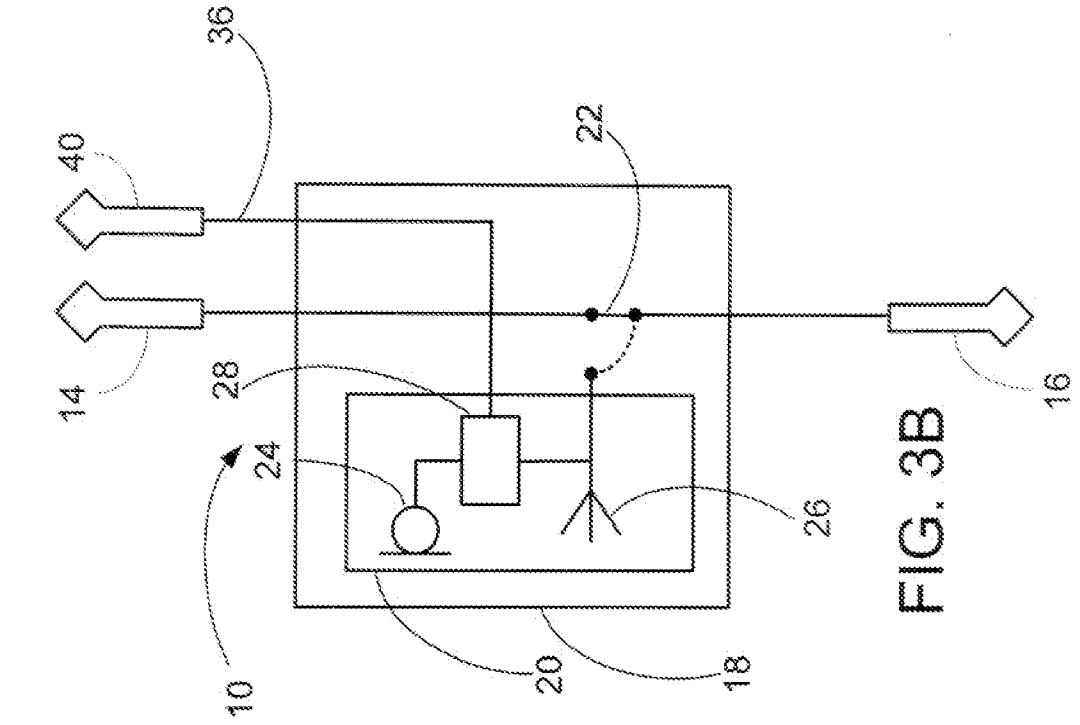


FIG. 3A

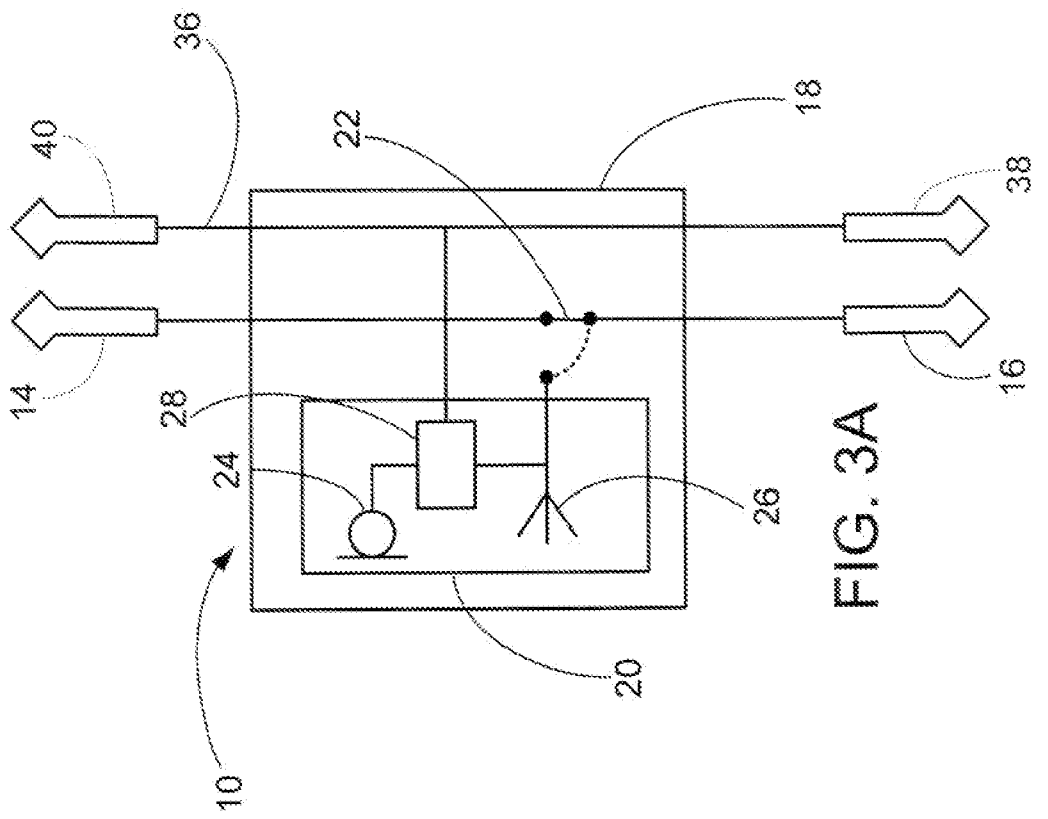


FIG. 3B

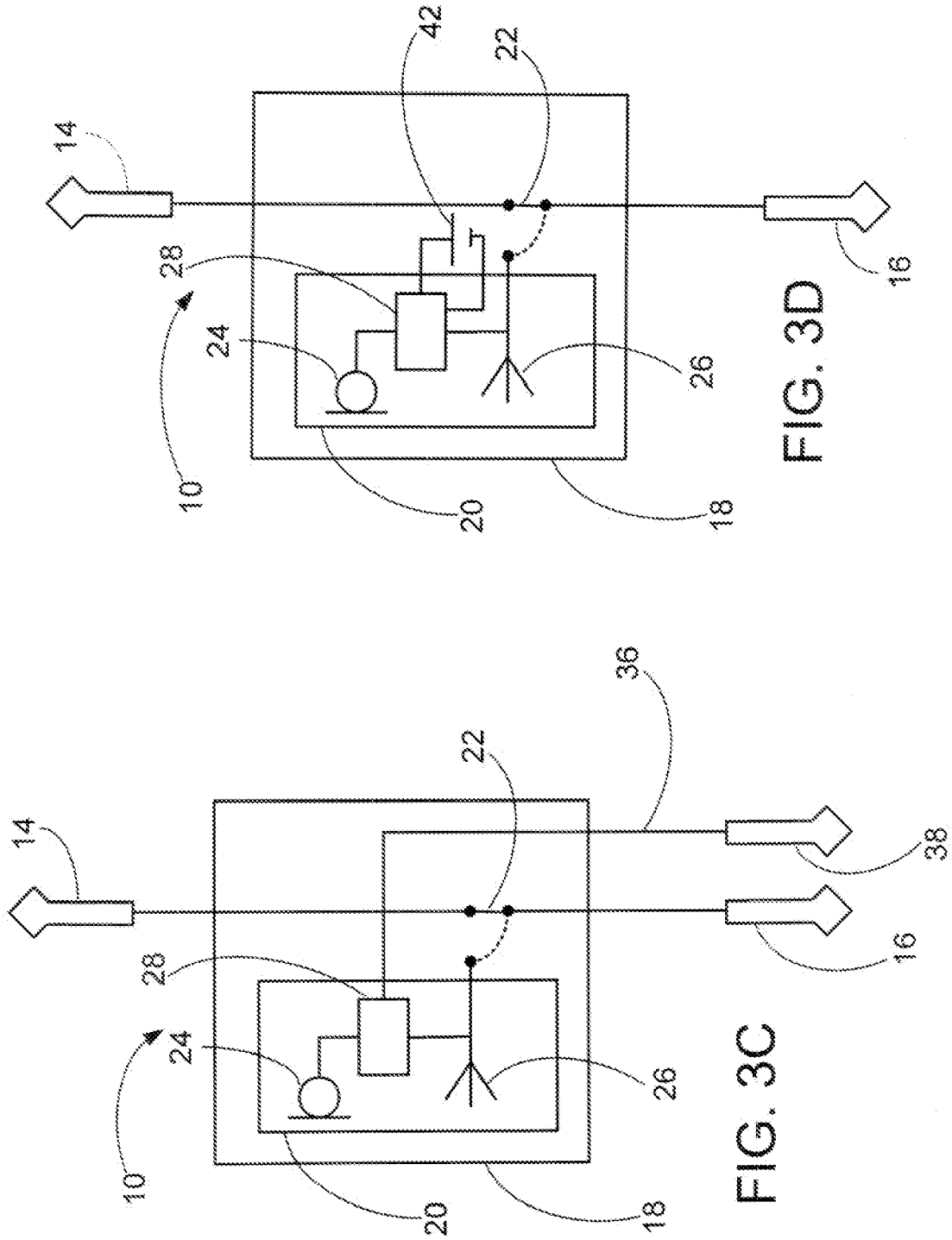


FIG. 3D

FIG. 3C

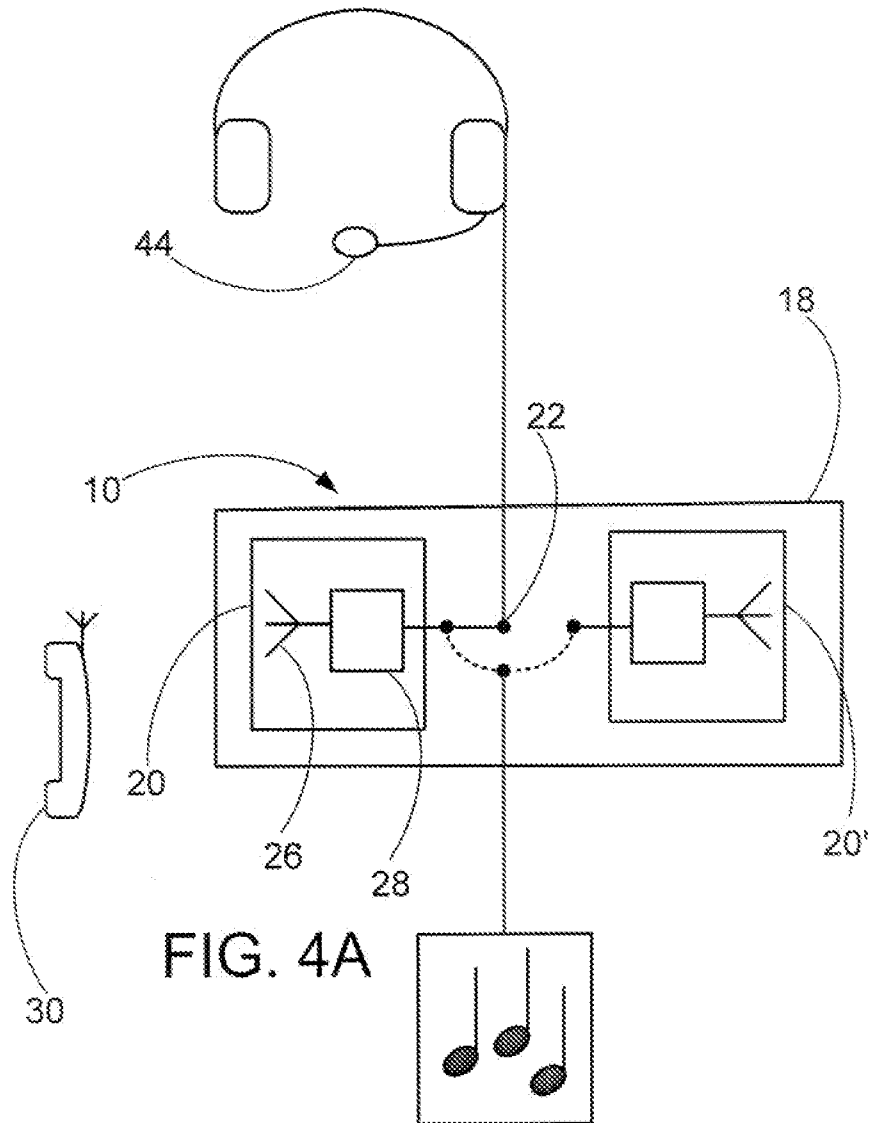
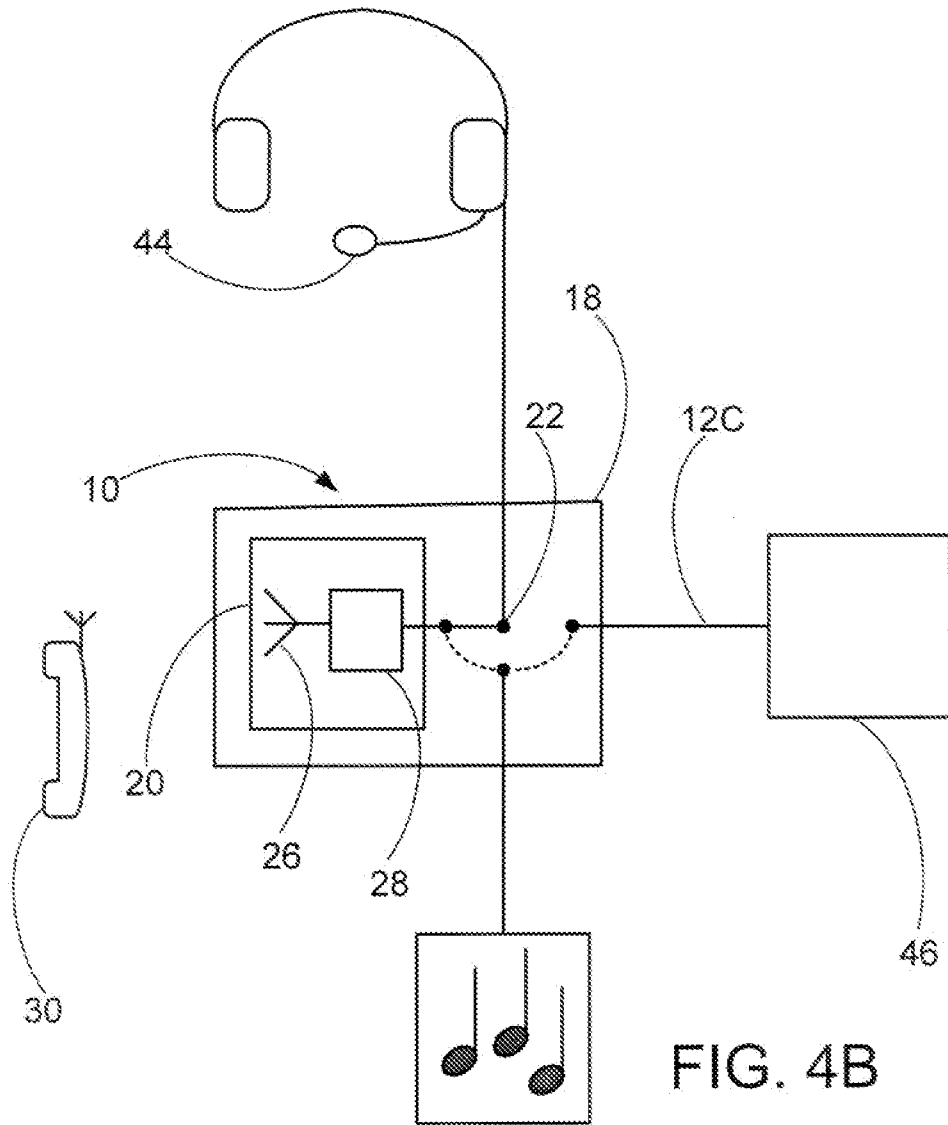


FIG. 4A



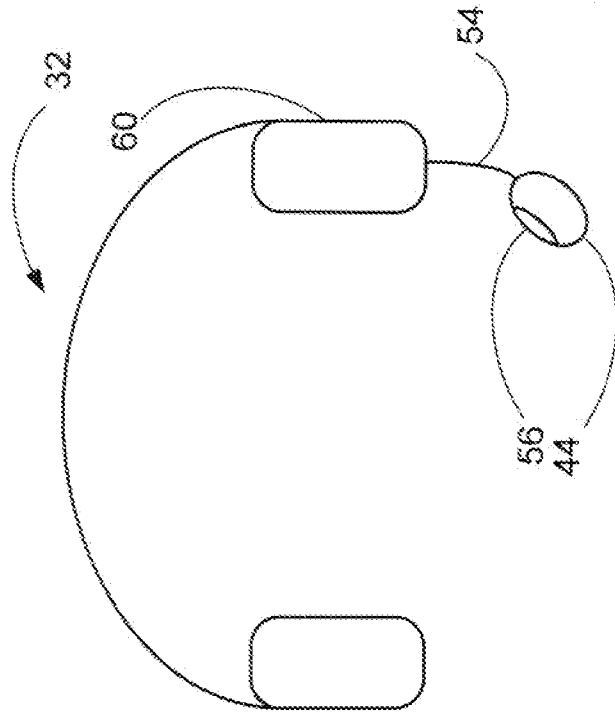


FIG. 5B

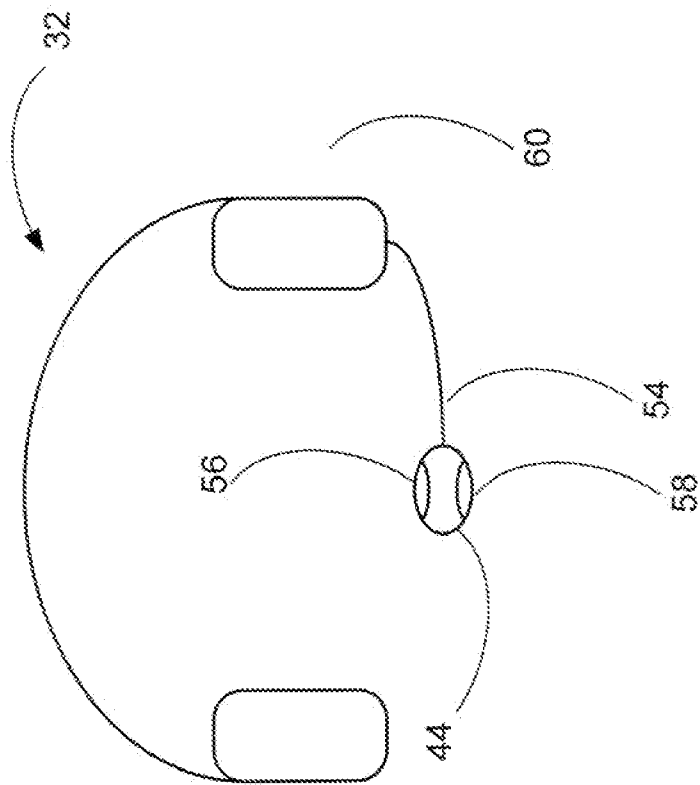


FIG. 5A

INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2007/064913

**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. H04M1/725 H04M1/60 H04R5/04  
 ADD. H04R1/32

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**  
 Minimum documentation searched (classification system followed by classification symbols)  
 H04R H04M

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)  
 EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages      | Relevant to claim No.   |
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| Y         | paragraphs [0003], [0010] - [0021],<br>[0029] - [0033]; figures 1,2                     | 4-9, 33,<br>34          |
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| Y         | paragraphs [0003], [0009] - [0014],<br>[0024] - [0028], [0032] - [0038]; figures<br>1-7 | 4-9, 21,<br>33, 34      |
|           | -----<br>-/--   |                         |

Further documents are listed in the continuation of Box C.  See patent family annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
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|---|---|
| Date of the actual completion of the international search<br><b>7 August 2007</b> | Date of mailing of the international search report<br><b>16/08/2007</b> |
|---|---|

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|---|---|
| Name and mailing address of the ISA/<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,<br>Fax: (+31-70) 340-3016 | Authorized officer<br><b>Navarri, Massimo</b> |
|---|---|

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/064913

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |   |                         |
|--|---|-------------------------|
| Category*  | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.   |
| X  | ANONYMOUS: "Combining telephony capability with portable music devices"<br>RESEARCH DISCLOSURE, MASON PUBLICATIONS,<br>HAMPSHIRE, GB,<br>vol. 443, no. 65, March 2001 (2001-03),<br>XP007127781<br>ISSN: 0374-4353                  | 1-3,<br>10-20,<br>22-32 |
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| P,X  | -----<br>US 2007/041582 A1 (LAM BIN W [US])<br>22 February 2007 (2007-02-22)<br>paragraphs [0002], [0047] - [0050];<br>figures 4,5  | 1-9,18,<br>25           |
| P,X  | -----<br>US 7 190 797 B1 (JOHNSTON TIM [US] ET AL)<br>13 March 2007 (2007-03-13)<br>column 1, lines 9-13<br>column 2, line 61 - column 3, line 39<br>column 5, line 24 - column 8, line 23;<br>figure 1                             | 35,36                   |

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| International application No<br>PCT/US2007/064913 |
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| US 7190797                             | B1               | 13-03-2007       | NONE                    |                  |