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(54) **SYSTEM AND METHOD FOR OBSCURING UNWANTED AMBIENT NOISE AND A MOBILE COMMUNICATIONS DEVICE AND CENTRAL OFFICE EQUIPMENT INCORPORATING THE SAME**

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(57) **ABSTRACT**

A system for, and method of, obscuring ambient noise with a mobile communications device and central office equipment including the system and/or method. In one embodiment, the mobile communications device includes: (1) a background sound generator (2) a mixer coupled to the background sound generator, (3) a user interface coupled to the mixer and configured to allow a user to indicate a selection for a sound and (4) control circuitry, configured to: (4A) detect the selection, (4B) direct the background sound generator to produce the sound and (4C) direct the mixer to mix the sound with a transmitted signal.

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(63) Continuation of application No. 10/667,624, filed on Sep. 22, 2003, now Pat. No. 7,162,212.

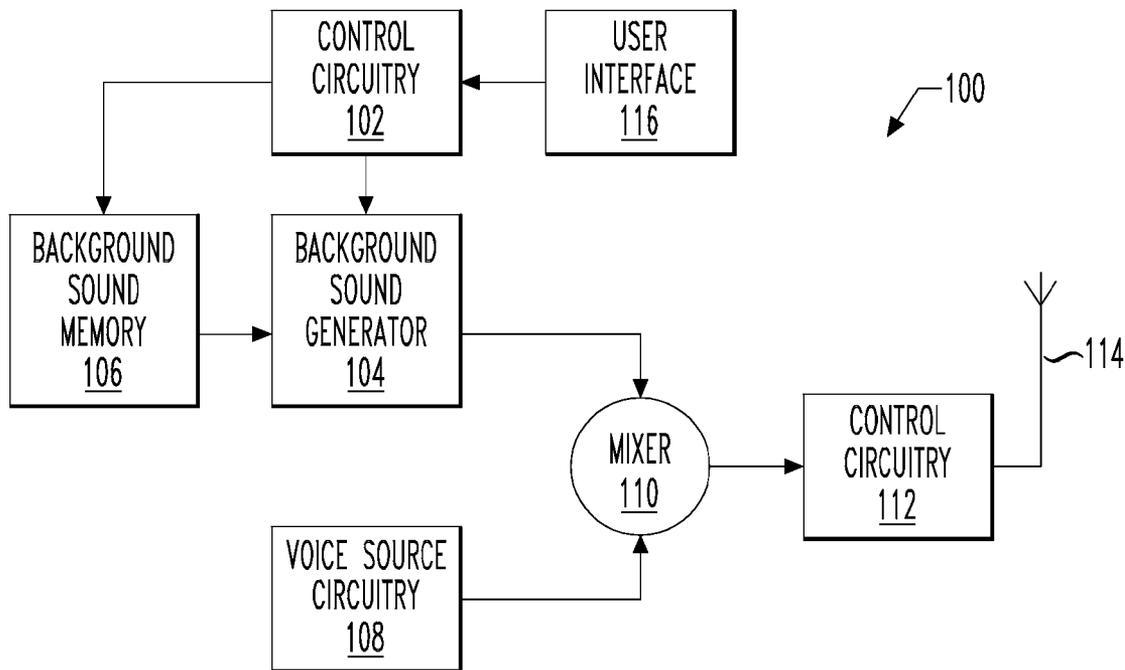


FIG. 1

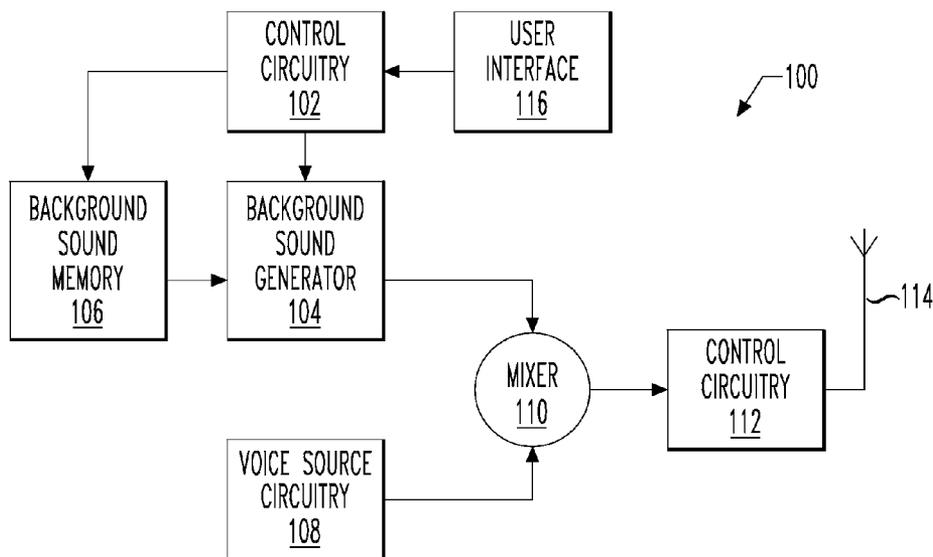


FIG. 2

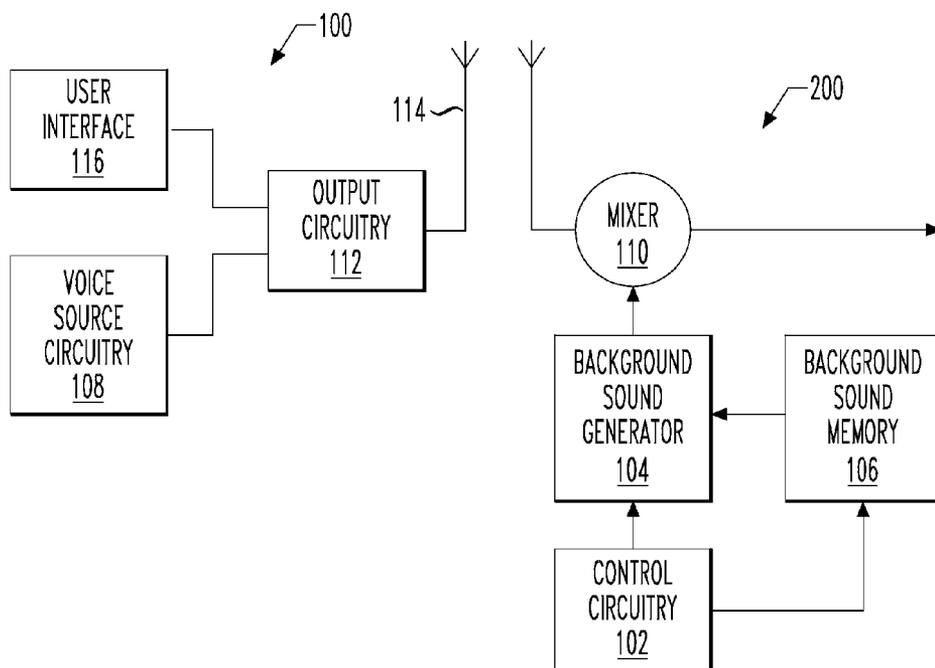
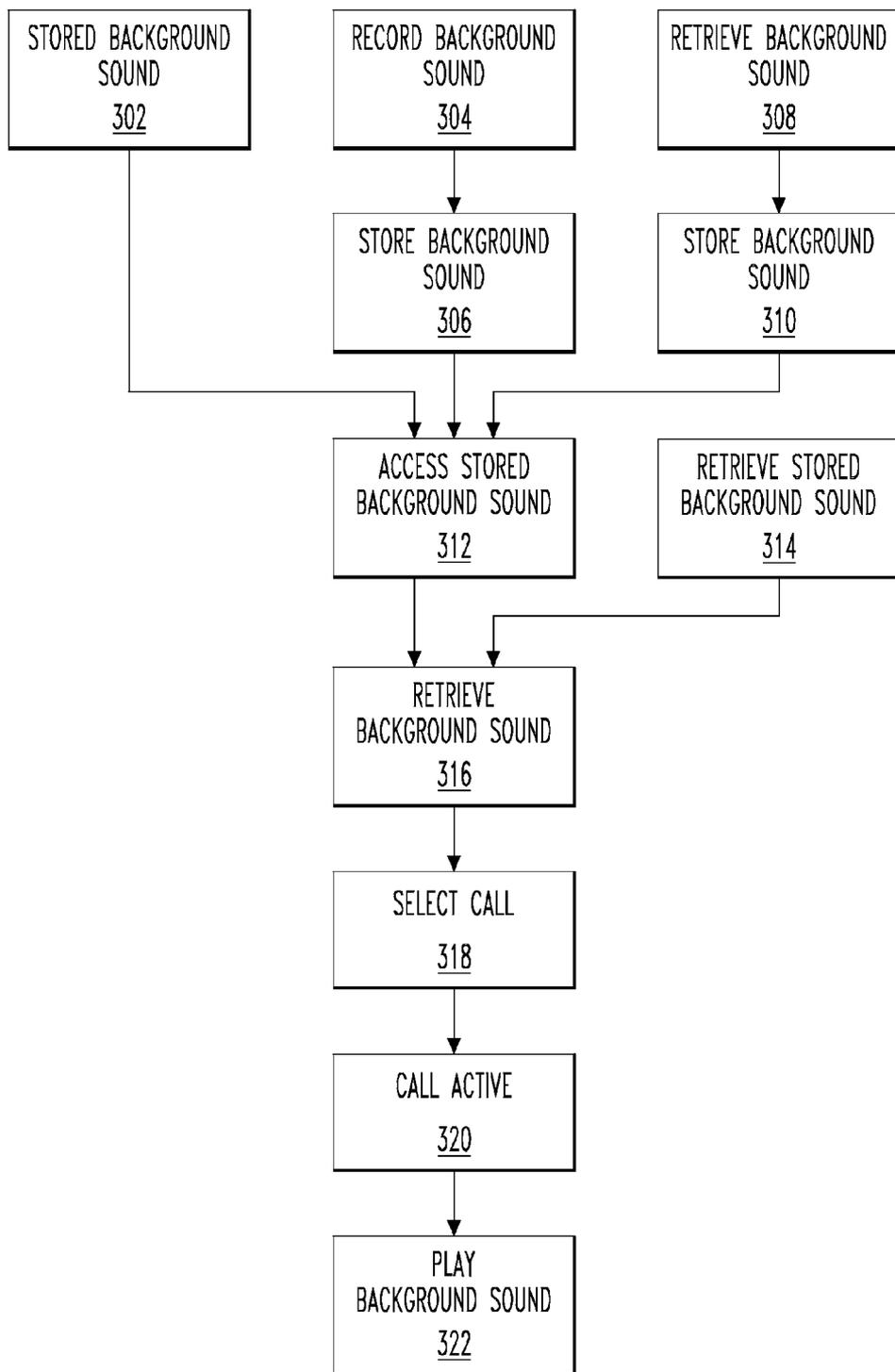


FIG. 3



SYSTEM AND METHOD FOR OBSCURING UNWANTED AMBIENT NOISE AND A MOBILE COMMUNICATIONS DEVICE AND CENTRAL OFFICE EQUIPMENT INCORPORATING THE SAME

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation of U.S. patent application Ser. No. 10/667,624, entitled "SYSTEM AND METHOD FOR OBSCURING UNWANTED AMBIENT NOISE AND HANDSET AND CENTRAL OFFICE EQUIPMENT INCORPORATING THE SAME," filed on Sep. 22, 2003, by David J. Bennetts, et al., which is currently pending. The above-listed application is commonly assigned with the present invention and is incorporated herein by reference as if reproduced herein in its entirety.

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention relates to telecommunications devices and services, and particularly to wireless and wireline telephones and voice services associated therewith.

BACKGROUND OF THE INVENTION

[0003] Communication systems are well established for establishing voice communication between two calling parties, and further such voice communications using mobile telephony are well established.

[0004] In such communication systems, it is well-known that in addition to a voice signal communicated from one party to another, ambient noise, reflecting the environment of the party, is also communicated. For example, the ambient noise may include traffic noise or general conversation noise from background conversations in a room.

[0005] In certain circumstances, the ambient noise for a party to the call may not be suitable for the nature of the call. For example, a business user making a call in a particular environment may wish not to convey the ambient noise of the environment in which he or she is making the call.

[0006] Furthermore, it is currently well-known in the field of communications that entertaining services in the field of mobile communications in particular are in great demand. Therefore any service which offers an entertaining aspect, or a novelty aspect, is desirable.

[0007] It is an aim of the present invention to provide a technique for enhancing voice communications.

SUMMARY OF THE INVENTION

[0008] According to the present invention, a system for, and method of, obscuring ambient noise. In one embodiment, the system includes: (1) a background sound generator configured to provide an output, (2) a mixer coupled to the background sound generator and (3) a user interface, coupled to the mixer, configured to cause the mixer to mix the output with a transmitted signal based upon a command from a user and allow the user to control a volume of the output.

[0009] In another aspect, the present invention provides a mobile communications device including: (1) a background sound generator (2) a mixer coupled to the background

sound generator, (3) a user interface coupled to the mixer and configured to allow a user to indicate a selection for a sound and (4) control circuitry, configured to: (4A) detect the selection, (4B) direct the background sound generator to produce the sound and (4C) direct the mixer to mix the sound with a transmitted signal.

[0010] In yet another aspect, the present invention provides a method of obscuring ambient noise, including: (1) generating a background sound, (2) responding to a user command by mixing the background sound with a transmitted signal and (3) responding to a user command to control a volume of the background sound.

[0011] In yet another aspect, the present invention provides central office equipment, including: (1) a background sound generator, (2) a mixer coupled to the background sound generator and (3) control circuitry, configured to: (3A) receive a selection for a sound from a user via a mobile communications device and (3B) direct the background sound generator to provide the sound based on the selection, and (3C) direct the mixer to mix the sound into a transmitted signal from the mobile communications device.

[0012] The foregoing has outlined preferred and alternative features of the present invention so that those skilled in the art may better understand the detailed description of the invention that follows. Additional features of the invention will be described hereinafter that form the subject of the claims of the invention. Those skilled in the art should appreciate that they can readily use the disclosed conception and specific embodiment as a basis for designing or modifying other structures for carrying out the same purposes of the present invention. Those skilled in the art should also realize that such equivalent constructions do not depart from the spirit and scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] For a more complete understanding of the present invention, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

[0014] FIG. 1 illustrates a wireless or wireline handset implementing an embodiment of the present invention;

[0015] FIG. 2 illustrates central office equipment implementing an embodiment of the present invention; and

[0016] FIG. 3 illustrates an embodiment of a method of obscuring ambient noise according to the present invention.

DETAILED DESCRIPTION

[0017] The present invention is described herein by way of reference to a particular preferred example. One skilled in the art will appreciate that the invention is not limited to such a specific example.

[0018] The present invention may be associated with a wireless handset, a wireline handset, central office (e.g., base station) equipment or any other suitable location or equipment. The purpose of the present invention is to provide, in addition to a voice signal from a near-end user to a far-end user in a communication network, a background sound at the near-end-user's choice. As is discussed further hereinbelow, the source of ambient noise is preferably selectable by the near-end user. Thus a near-end user is able to obscure, at

least to some extent, the ambient noise which a far-end user hears. The near-end user may be a calling party or a called party. In a call connection, both parties may be considered to be near-end users or far-end users: the near-end user is the party that is controlling the background noise for their voice, which may be both parties.

[0019] For the purpose of the following description, it is assumed that the calling party is provided with a handset equipped with a user interface in accordance with the present invention (which may be a conventional wireless or wireline handset keypad). Thus in the following the calling party may be considered a near-end user and the called party is the far-end user. It will be understood by one skilled in the art, however, that in the following example the called party may also have a handset adapted in accordance with the present invention such that they may act as a near-end user when speaking.

[0020] FIG. 1 illustrates a block diagram of elements of a communications handset used by a calling party in one embodiment of the present invention.

[0021] The communications handset 100 comprises control circuitry 102, a background sound generator 104, a background sound memory 106, voice source circuitry 108, a mixer 110, output circuitry 112, an antenna 114 and a user interface 116.

[0022] The voice source circuitry 108 represents a standard circuit in a communications handset for receiving a voice of a user of the handset and converting such voice into a form suitable for transmission on a communication interface. The voice source circuitry 108 may therefore generate a voice signal at its output in accordance with an appropriate telephony standard. The output circuitry 112 is similarly conventional output circuitry suitable for converting the voice signal at the output of the voice source circuitry 108 into a form suitable for transmission by the antenna 114.

[0023] In accordance with the present invention, there is further provided the background sound generator 104 for generating a background sound signal output. The mixer 110 mixes the background sound signal output with the transmitted signal provided by the voice source circuitry 108, and the output of the mixer 110 forms the input to the output circuitry 112. Thus the transmitted signal, together with the background sound mixed therewith, is transmitted on the appropriate transmission link.

[0024] In embodiments of the invention the background sound generator 104 may provide an output in a variety of ways. The background sound generator 104 may synthesize the output (as described below), reproduce the output from stored background sound data, reproduce the output from a data stream received in real time or generate the output in any suitable manner. The background sound may be music, white noise, colored noise, out-of-phase ambient noise, simulated alternative ambient noise or any other suitable background sound. Those skilled in the pertinent art will readily see how these alternative ways can be implemented.

[0025] The background sound generator 104 is, in the illustrated embodiment, controlled by the control circuitry 102, which in addition preferably controls a background sound memory 106, which provides inputs to the background sound generator 104. In the illustrated embodiment, the background sound memory 106 stores a plurality of

different background sounds. The user of the communications handset is able to select a particular background sound using the user interface 116, and the control circuitry 102 detects selection of the appropriate background sound and controls the background sound memory 106 to provide such to the background sound generator 104.

[0026] The background sound may be music, white noise (random noise equal in time-averaged amplitude over its spectrum), colored noise (random noise that varies in time-averaged amplitude over its spectrum), out-of-phase ambient noise (carried out by sensing the ambient noise and about 180° phase-shifting it to yield background sound), simulated alternative ambient noise or any other suitable background sound.

[0027] The advantage of the embodiment of FIG. 1 is that only handsets requires modification (other telecommunications infrastructure can remain intact) and that background sounds can probably be more user-customizable, as they are stored or synthesized in the communications handset 100.

[0028] FIG. 2 illustrates central office equipment 200 implementing an alternative embodiment of the present invention. Many of the elements of FIG. 1 are present in the embodiment of FIG. 2. However, the control circuitry 102, the background sound generator 104, the background sound memory 106, and the mixer 110 have been relocated to the central office equipment 200. The other elements remain in the communications handset 100.

[0029] The user issues a command via the user interface 116, as before. The command is directed to the central office equipment 200, wherein the background sound generator 104 is, under control of the control circuitry 102, engaged to generate a background sound. As before, the sound may be stored in the background sound memory 106 or synthesized as described both above and below. The mixer 110 mixes the background sound into the user's transmitted signal. The advantage of this embodiment is that no handset requires modification, almost certainly a greater number of possible background sounds can be made available to the user and a charge can be levied for background sound, which now takes the form of a service.

[0030] Turning now to FIG. 3, in one embodiment, background sounds are pre-stored in a memory of the communications handset. As such, a user of the handset is able to select a particular pre-stored background sound in a step 302 from the pre-stored background sounds available.

[0031] In a second embodiment, or in an embodiment additional to the first embodiment, the background sound may be recorded by the user using the telephony handset in a step 304. The recorded background sound may then be stored in the background sound memory in a step 306.

[0032] In a third embodiment, which may be used in combination with either the first or second embodiment, the user may retrieve a background sound in a step 308. The background sound may be retrieved, for example, from an Internet website or through being copied from another handset. The retrieved background sound is again stored in the background sound memory in a step 310.

[0033] When using the handset, and prior to making a telephone call, the user of the handset accesses stored background sounds in a step 312. In step 312, the user gains

access to the background sound stored in the background sound memory 106. In an alternative embodiment, which embodiment may be provided in parallel with any of the first, second and third embodiments, the user of the handset may gain access to a background sound dynamically, by receiving a streamed background sound, for example via a live Internet access. This embodiment is represented by step 314.

[0034] In step 316, the user of the telephony handset selects the appropriate background sound, either by retrieving from stored background sounds in step 312 or receiving a streamed background sound in 314.

[0035] Thereafter, the user selects a number for calling in a step 318, and the call becomes active in step 320. When the call becomes active, the control circuitry 102 controls the background sound generator 104 in a step 322 and the background sound is played.

[0036] Thus, the called party hears the voice of the calling party together with the appropriate background sound. A user of a telephony system may select an appropriate background sound to accompany their telephone call.

[0037] It will be understood that the invention is not limited to the embodiments described with reference to FIGS. 1, 2 and 3, and further modifications and adaptations may be incorporated. For example, in the foregoing there is discussed the possibility of the background sound being pre-stored, recorded, retrieved or live-streamed. Such sources for the background sound are not exhaustive. There is envisaged, for example, a further embodiment in which there is provided a means for generating background sounds, such as FM synthesis. FM synthesis may provide a lower cost implementation than the provision of storage means for storing background sounds.

[0038] In the above-described embodiments, activation of the background sounds is initiated by the calling party. For example the calling party may select a background sound using a menu provided on the user interface of the calling parties handset. The background sounds may be pre-programmed, for example stored in the background sound memory 106 of FIG. 1. Where the background sounds are pre-programmed, the calling party may select a change of background sound based on a programmed trigger. For example, the background may change based on selection of a pre-programmed button on the handset, an elapsed time period associated with a timer, or responsive to voice activation. Such changes also are not limited to arrangements where the background sounds are pre-stored. A dynamic change of background noise may similarly be triggered responsive to such stimuli.

[0039] In the embodiments described above, the techniques described are based on the calling party selecting a background noise. In alternative arrangements, the background noise selection may be automated, for example in dependence on the identity of the number called. Further the invention is not limited to implementations where a call is made or initiated from a handset.

[0040] In embodiments, the handset may be further adapted such the volume of the background noise may be controllable.

[0041] The ability to choose a background noise as described above applies also to a called party. Again in the

case of a called party, in addition to the user selective techniques described herein, the background noise selection may be automated. For example the background noise may be automatically selected in dependence on the caller identity. A particular background noise may be associated, for example, with an unknown caller.

[0042] Although the present invention has been described in detail, those skilled in the art should understand that they can make various changes, substitutions and alterations herein without departing from the spirit and scope of the invention in its broadest form.

What is claimed is:

1. A system for obscuring ambient noise, comprising:
 - a background sound generator configured to provide an output;
 - a mixer coupled to said background sound generator; and
 - a user interface, coupled to said mixer, configured to cause said mixer to mix said output with a transmitted signal based upon a command from a user and allow said user to control a volume of said output.
2. The system as recited in claim 1 wherein said background sound generator synthesizes said output.
3. The system as recited in claim 1 wherein said background sound generator reproduces said output from stored background sound data.
4. The system as recited in claim 1 wherein said background sound generator reproduces said output from a data stream received in real time.
5. The system as recited in claim 1 wherein said output is selectable via said user interface.
6. The system as recited in claim 1 wherein said background sound is a sound selected from the group consisting of:
 - music,
 - white noise,
 - colored noise,
 - out-of-phase ambient noise, and
 - simulated alternative ambient noise.
7. The system as recited in claim 1 wherein said system is associated with a handset selected from the group consisting of:
 - a wireless handset, and
 - a wireline handset.
8. A mobile communications device, comprising:
 - a background sound generator;
 - a mixer coupled to said background sound generator;
 - a user interface coupled to said mixer and configured to allow a user to indicate a selection for a sound; and
 - control circuitry, configured to detect said selection and direct said background sound generator to produce said sound, said control circuitry further configured to direct said mixer to mix said sound with a transmitted signal.
9. The mobile communications device of claim 8 wherein said control circuitry is further configured to allow said user to control a volume of said sound.

10. The mobile communications device of claim 8 further comprising a background sound memory, said control circuitry configured to direct said background sound memory to provide said sound to said background sound generator.

11. The mobile communications device of claim 8 wherein said sound is a sound selected from the group consisting of:

- music,
- white noise,
- colored noise, and
- out-of-phase ambient noise.

12. The mobile communications device of claim 8 wherein said sound is a simulated alternative ambient noise.

- 13. A method of obscuring ambient noise, comprising:
 - generating a background sound;
 - responding to a user command by mixing said background sound with a transmitted signal; and
 - responding to a user command to control a volume of said background sound.

14. The method as recited in claim 13 wherein said generating comprises synthesizing said background sound.

15. The method as recited in claim 13 wherein said generating comprises reproducing said background sound from stored background sound data.

16. The method as recited in claim 13 wherein said generating comprises reproducing said background sound from a data stream received in real time.

17. The method as recited in claim 13 further comprising selecting said background sound via said user interface.

18. The method as recited in claim 17 wherein said background sound is a sound selected from the group consisting of:

- music,
- white noise,
- colored noise, and
- out-of-phase ambient noise.

19. Central office equipment, comprising:

- a background sound generator;
- a mixer coupled to said background sound generator; and
- control circuitry, configured to receive a selection for a sound from a user via a mobile communications device and direct said background sound generator to provide said sound based on said selection, said control circuitry further configured to direct said mixer to mix said sound into a transmitted signal from said mobile communications device.

20. The central office equipment of claim 19 wherein said control circuitry is further configured to allow said user to control a volume of said sound.

21. The central office equipment of claim 19 further comprising a background sound memory, said control circuitry configured to direct said background sound memory to provide said sound to said background sound generator.

22. The central office equipment of claim 19 wherein said sound is a sound selected from the group consisting of:

- music,
- white noise,
- colored noise,
- out-of-phase ambient noise, and
- a simulated alternative ambient noise.

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