CLAIMS

1. A method of processing an audio signal comprising:

outputting a first part of a first audio signal;

picking up the output first part of the first audio signal as a second audio signal;

comparing a second part of the first audio signal and the second audio signal;

modifying the second part of the first audio signal based on the result of the comparison; and

outputting the modified second part of the first audio signal.

2. The method of claim 1, wherein the steps of outputting, picking up, comparing and modifying are repeated at a predetermined time interval that allows substantially real-time processing of the audio signal.

3. The method of claim 1, wherein the step of outputting the first part of the first audio signal comprises outputting the first part of the first audio signal through a speaker of a headset.

4. The method of claim 3, wherein the step of picking up the output first part of the first audio signal as the second audio signal comprises receiving the output first part of the first audio signal by a microphone.

5. The method of claim 4, wherein the microphone is located within an ear cup of the headset such that when a wearer wears the headset, the microphone is configured to be positioned substantially near the entrance of the ear canal of the wearer.

6. The method of claim 4, wherein the microphone is a microelectromechanical system (MEMS) microphone.

7. The method of claim 3, wherein the second audio signal comprises a left channel audio signal and a right channel audio signal of the headset.

8. The method of claim 1, wherein the second audio signal further comprises a noise signal.

9. The method of claim 3, wherein the output first part of the first audio signal comprises a reflection of the first part of the first audio signal.

10. The method of claim 9, wherein the reflection of the first part of the first audio signal comprises a reflection of the first part of the first audio signal from at least part of a pinna of a wearer of the headset.

11. The method of claim 1, wherein the step of comparing the second part of the first audio signal and the second audio signal comprises comparing at least one of the amplitude of the second part of the first audio signal and the amplitude of the second audio signal to obtain an amplitude correction factor, the frequency of the second part of the first audio signal and the frequency of the second audio signal to obtain a frequency correction factor, or the phase of the second part of the first audio signal and the phase of the second audio signal to obtain a phase correction factor.

12. The method of claim 11, wherein the step of modifying the second part of the first audio signal comprises modifying the second part of the first audio signal based on at least one of the amplitude correction factor, the frequency correction factor or the phase correction factor.

13. The method of claim 1, wherein the step of modifying the second part of the first audio signal comprises increasing or decreasing at least one of the amplitude, the frequency or the phase of the second part of the first audio signal.

14. The method of claim 1, wherein the step of modifying the second part of the first audio signal comprises modifying the second part of the first audio signal based on a Head Related Transfer Function (HRTF).

15. The method of claim 1, further comprising prior to comparing the second part of the first audio signal and the second audio signal, adding a delay to the second part of the first audio signal.

16. The method of claim 1, further comprising prior to modifying the second part of the first audio signal, adding another delay to the result of the comparison.

17. The method of claim 1, wherein the second part of the first audio signal is an analog signal.

18. The method of claim 17, further comprising converting the analog second part of the first audio signal into a digital signal.

19. An audio signal output device comprising:

a speaker configured to output a first part of a first audio signal;

a microphone configured to pick up the output first part of the first audio signal as a second audio signal;

a comparator configured to compare a second part of the first audio signal and the second audio signal; and

a circuit configured to modify the second part of the first audio signal based on the result of the comparison,

wherein the speaker is further configured to output the modified second part of the first audio signal.

20. The audio signal output device of claim 19, wherein the speaker, the microphone, the comparator and the circuit are configured to operate repetitively at a predetermined time interval that allows substantially real-time audio signal processing.

21. The audio signal output device of claim 19, wherein the microphone is a microelectrical-mechanical system (MEMS) microphone.

22. The audio signal output device of claim 19, wherein the comparator is configured to compare at least one of the amplitude of the second part of the first audio signal and the amplitude of the second audio signal to obtain an amplitude correction factor, the frequency of the second part of the first audio signal and the frequency of the second audio signal to obtain a frequency correction factor, or the phase of the second part of the first audio signal and the phase of the second audio signal to obtain a phase correction factor.

23. The audio signal output device of claim 22, wherein the circuit is configured to modify the second part of the first audio signal based on at least one of the amplitude correction factor, the frequency correction factor or the phase correction factor.

24. The audio signal output device of claim 19, wherein the circuit is configured to increase or decrease at least one of the amplitude, the frequency or the phase of the second part of the first audio signal.

25. The audio signal output device of claim 19, wherein the circuit is configured to modify the second part of the first audio signal based on a Head Related Transfer Function (HRTF).

26. The audio signal output device of claim 19, further comprising a phase shifter configured to add a delay to the second part of the first audio signal.

27. The audio signal output device of claim 19, further comprising another phase shifter configured to add another delay to the result of the comparison.

28. The audio signal output device of claim 19, further comprising an analog-to-digital converter configured to convert the second part of the first audio signal into a digital signal.

29. A headset comprising:

a pair of ear cups;

a speaker located in each ear cup; and

a microphone located within at least one of the pair of the ear cups,

wherein the speaker is substantially centrally located with the ear cup; and

wherein the microphone is located adjacent to the speaker.

30. The headset of claim 29, wherein the microphone is located below the speaker such that when a wearer wears the headset, the microphone is configured to face a substantially lower part of the external auditory canal of the wearer.

31. The headset of claim 30, wherein the microphone is located within an area having a radius of about 1 cm to 2 cm from the substantially centrally located speaker.

32. The headset of claim 29, wherein the headset comprises a plurality of speakers in each ear cup.

33. The headset of claim 29, wherein the microphone is a microelectromechanical system (MEMS) microphone.

CLAIMS

1. A method of processing an audio signal comprising:

outputting a first part of a first audio signal;

picking up the output first part of the first audio signal as a second audio signal;

comparing a second part of the first audio signal and the second audio signal;

modifying the second part of the first audio signal based on the result of the comparison; and

outputting the modified second part of the first audio signal;

wherein the step of outputting the first part of the first audio signal comprises outputting the first part of the first audio signal through a speaker of a headset;

wherein the step of picking up the output first part of the first audio signal as the second audio signal comprises receiving the output first part of the first audio signal by a microphone;

wherein the microphone is a microelectromechanical system (MEMS) microphone.

2. A method of processing an audio signal comprising:

outputting a first part of a first audio signal;

picking up the output first part of the first audio signal as a second audio signal;

comparing a second part of the first audio signal and the second audio signal;

modifying the second part of the first audio signal based on the result of the comparison; and

outputting the modified second part of the first audio signal;

wherein the step of outputting the first part of the first audio signal comprises outputting the first part of the first audio signal through a speaker of a headset;

wherein the output first part of the first audio signal comprises a reflection of the first part of the first audio signal.

3. The method of claim 2, wherein the reflection of the first part of the first audio signal comprises a reflection of the first part of the first audio signal from at least part of a pinna of a wearer of the headset.

4. A method of processing an audio signal comprising:

outputting a first part of a first audio signal;

picking up the output first part of the first audio signal as a second audio signal;

comparing a second part of the first audio signal and the second audio signal;

modifying the second part of the first audio signal based on the result of the comparison; and

outputting the modified second part of the first audio signal;

wherein the step of modifying the second part of the first audio signal comprises modifying the second part of the first audio signal based on a Head Related Transfer Function (HRTF).

5. A method of processing an audio signal comprising:

outputting a first part of a first audio signal;

picking up the output first part of the first audio signal as a second audio signal;

comparing a second part of the first audio signal and the second audio signal;

modifying the second part of the first audio signal based on the result of the comparison;

outputting the modified second part of the first audio signal; and

prior to comparing the second part of the first audio signal and the second audio signal, adding a delay to the second part of the first audio signal.

6. A method of processing an audio signal comprising:

outputting a first part of a first audio signal;

picking up the output first part of the first audio signal as a second audio signal;

comparing a second part of the first audio signal and the second audio signal;

modifying the second part of the first audio signal based on the result of the comparison;

outputting the modified second part of the first audio signal; and

prior to modifying the second part of the first audio signal, adding another delay to the result of the comparison.

7. The method of any one of claims 1 to 6, wherein the steps of outputting, picking up, comparing and modifying are repeated at a predetermined time interval that allows substantially real-time processing of the audio signal.

8. The method of any one of claims 4 to 6, wherein the step of outputting the first part of the first audio signal comprises outputting the first part of the first audio signal through a speaker of a headset.

9. The method of claim 8, wherein the step of picking up the output first part of the first audio signal as the second audio signal comprises receiving the output first part of the first audio signal by a microphone.

10. The method of claim 9, wherein the microphone is located within an ear cup of the headset such that when a wearer wears the headset, the microphone is configured to be positioned substantially near the entrance of the ear canal of the wearer.

11. The method of claim 8, wherein the second audio signal comprises a left channel audio signal and a right channel audio signal of the headset.

12. The method of any one of claims 1 to 11, wherein the second audio signal further comprises a noise signal.

13. The method of any one of claims 1 to 12, wherein the step of comparing the second part of the first audio signal and the second audio signal comprises comparing at least one of the amplitude of the second part of the first audio signal and the amplitude of the second audio signal to obtain an amplitude correction factor, the frequency of the second part of the first audio signal and the frequency of the second audio signal to obtain a frequency correction factor, or the phase of the second part of the first audio signal and the phase of the second audio signal to obtain a phase correction factor.

14. The method of claim 13, wherein the step of modifying the second part of the first audio signal comprises modifying the second part of the first audio signal based on at least one of the amplitude correction factor, the frequency correction factor or the phase correction factor.

15. The method of any one of claims 1 to 14, wherein the step of modifying the second part of the first audio signal comprises increasing or decreasing at least one of the amplitude, the frequency or the phase of the second part of the first audio signal.

16. The method of any one of claims 1 to 15, wherein the second part of the first audio signal is an analog signal.

17. The method of claim 16, further comprising converting the analog second part of the first audio signal into a digital signal.

18. An audio signal output device comprising:

a speaker configured to output a first part of a first audio signal;

a microphone configured to pick up the output first part of the first audio signal as a second audio signal;

a comparator configured to compare a second part of the first audio signal and the second audio signal; and

a circuit configured to modify the second part of the first audio signal based on the result of the comparison,

wherein the speaker is further configured to output the modified second part of the first audio signal; and

wherein the microphone is a microelectrical-mechanical system (MEMS) microphone.

19. An audio signal output device comprising:

a speaker configured to output a first part of a first audio signal;

a microphone configured to pick up the output first part of the first audio signal as a second audio signal;

a comparator configured to compare a second part of the first audio signal and the second audio signal; and

a circuit configured to modify the second part of the first audio signal based on the result of the comparison,

wherein the speaker is further configured to output the modified second part of the first audio signal; and

wherein the circuit is configured to modify the second part of the first audio signal based on a Head Related Transfer Function (HRTF).

20. An audio signal output device comprising:

a speaker configured to output a first part of a first audio signal;

a microphone configured to pick up the output first part of the first audio signal as a second audio signal;

a comparator configured to compare a second part of the first audio signal and the second audio signal;

a circuit configured to modify the second part of the first audio signal based on the result of the comparison; and

a phase shifter configured to add a delay to the second part of the first audio signal;

wherein the speaker is further configured to output the modified second part of the first audio signal.

21. An audio signal output device comprising:

a speaker configured to output a first part of a first audio signal;

a microphone configured to pick up the output first part of the first audio signal as a second audio signal;

a comparator configured to compare a second part of the first audio signal and the second audio signal;

a circuit configured to modify the second part of the first audio signal based on the result of the comparison; and

another phase shifter configured to add another delay to the result of the comparison;

wherein the speaker is further configured to output the modified second part of the first audio signal.

22. The audio signal output device of any one of claims 18 to 21, wherein the speaker, the microphone, the comparator and the circuit are configured to operate repetitively at a predetermined time interval that allows substantially real-time audio signal processing.

23. The audio signal output device of any one of claims 18 to 22, wherein the comparator is configured to compare at least one of the amplitude of the second part of the first audio signal and the amplitude of the second audio signal to obtain an amplitude correction factor, the frequency of the second part of the first audio signal and the frequency of the second audio signal to obtain a frequency correction factor, or the phase of the second part of the first audio signal and the phase of the second audio signal to obtain a phase correction factor.

24. The audio signal output device of claim 23, wherein the circuit is configured to modify the second part of the first audio signal based on at least one of the amplitude correction factor, the frequency correction factor or the phase correction factor.

25. The audio signal output device of any one of claims 18 to 24, wherein the circuit is configured to increase or decrease at least one of the amplitude, the frequency or the phase of the second part of the first audio signal.

26. The audio signal output device of any one of claims 18 to 25, further comprising an analog-to-digital converter configured to convert the second part of the first audio signal into a digital signal.

27. A headset comprising:

a pair of ear cups;

a speaker located in each ear cup; and

a microphone located within at least one of the pair of the ear cups,

wherein the speaker is substantially centrally located with the ear cup; and

wherein the microphone is located adjacent to the speaker;

wherein the headset comprises a plurality of speakers in each ear cup.

28. A headset comprising:

a pair of ear cups;

a speaker located in each ear cup; and

a microphone located within at least one of the pair of the ear cups,

wherein the speaker is substantially centrally located with the ear cup; and

wherein the microphone is located adjacent to the speaker;

wherein the microphone is a microelectromechanical system (MEMS) microphone.

29. The headset of claim 27 or claim 28, wherein the microphone is located below the speaker such that when a wearer wears the headset, the microphone is configured to face a substantially lower part of the external auditory canal of the wearer.

30. The headset of any one of claims 27 to 29, wherein the microphone is located within an area having a radius of about 1 cm to 2 cm from the substantially centrally located speaker.