CLAIMS

1. A speaker for generating a surround sound signal, the speaker comprising:

a processing unit configured to:

(a) receive an audio signal having a left channel (L) signal and a right channel (R) signal;

(b) process separately and independently the L and R channel signals to produce processed L and R channel signals; and

(c) mix the processed L and R channel signals to produce the surround sound signal, and

a subwoofer unit comprising a low frequency effects channel formed by a combination of the received L and R channel signals, wherein the subwoofer unit produces a first subwoofer processed signal and a second subwoofer processed signal,

wherein mixing the processed L and R channel signals comprises:

mixing the processed L channel signal with the second subwoofer processed signal; and

mixing the processed R channel signal with the first subwoofer processed signal, and

wherein the surround sound signal is generated based on at least one of mixing the processed L signal with the second subwoofer processed signal and mixing the processed R signal with the first subwoofer processed signal.

2. The speaker according to claim 1, wherein the left channel signal has a junction which splits the left channel signal into a first portion and a second portion; wherein the first portion signal is processed by a high pass filter, an equaliser, an all pass filter and a dynamic range control; and the second portion signal is processed by a high pass filter, an equaliser, a low pass filter and a dynamic range control.

3. The speaker according to any one of the preceding claims, wherein the speaker comprises left and right drivers, and the processed left and right channel signals are channelled to left and right drivers respectively; and wherein the processed right channel

signal channelled to the right driver is out of phase to the processed left channel signal channelled to the left driver.

4. The speaker according to claim 2 or 3, wherein the high pass filter is configured to have a cut-off frequency of 70-200Hz.

5. The speaker according to any one of claims 2 to 4, wherein the low pass filter is configured to have a cut-off frequency of 1200Hz.

6. The speaker according to any one of the preceding claims, wherein the subwoofer unit comprises a processing unit including any one selected from the group: a high pass filter, a low pass filter, an equaliser, and a dynamic range control.

7. The speaker according to claim 6, wherein the low pass filter has a cut-off frequency of 70-200Hz.

8. The speaker according to any one of the preceding claims, wherein the subwoofer unit has 12dB boost at about 180Hz.

9. The speaker according to any one of the preceding claims, further comprising:

an adder block to mix the processed L channel signal with the second subwoofer processed signal, and

another adder block to mix the processed R channel signal with the first subwoofer processed signal.

10. The speaker according to any one of the preceding claims, wherein processing separately and independently the L and R channel signals comprises processing separately and independently either a combination of or only the L and R channel signals to produce the processed L and R channel signals.

11. The speaker according to claim 1, wherein the subwoofer unit comprising the low frequency effects channel formed by the combination of the received L and R channel signals, summed to produce a main subwoofer signal, wherein the subwoofer unit passes the main subwoofer signal through a series of components for digital signal processing,

the components comprising a Low Pass Filter, a High Pass Filter, an Equaliser Filter and a Dynamic Range Control, to generate a processed signal, wherein the processed signal is divided to produce the first subwoofer processed signal and the second subwoofer processed signal.

12. A method for generating a surround sound signal in a speaker including a processing unit, the method comprising:

(a) receiving with the processing unit an audio signal having a left channel (L) signal and a right channel (R) signal;

(b) processing with the processing unit separately and independently the L and R channel signals to produce processed L and R channel signals;

(c) producing, based on a combination of the received L and R channel signals, a first subwoofer processed signal and a second subwoofer processed signal;

(d) mixing the processed L channel signal with the second subwoofer processed signal; and

(e) mixing the processed R channel signal with the first subwoofer processed signal,

wherein the surround sound signal is generated based on at least one of mixing the processed L channel signal with the second subwoofer processed signal and mixing the processed R channel signal with the first subwoofer processed signal.

13. The method according to claim 12, wherein processing includes:

(a) filtering the L and R channel signals; and

(b) controlling a dynamic range of the filtered L and R channel signals.

14. The method according to claim 12 or 13, wherein the L and R channel signals are processed by any one selected from the group: a high pass filter, a low pass filter, all pass filter, an equaliser, and a dynamic range control.

15. The method according to any one of claims 12 to 14, wherein the left channel signal is split into a first portion and a second portion; and wherein the first portion signal is processed by a high pass filter, an equaliser, an all pass filter and a dynamic

range control; and the second portion signal is processed by a high pass filter, an equaliser, a low pass filter and a dynamic range control.

16. The method according to any one of the claims 12 to 15, wherein the processed left and right channel signals are channelled to left and right drivers respectively; and wherein the processed right channel signal is channelled to the right driver out of phase to the processed left channel signal channelled to the left driver.

17. The method according to any one of claims 12 to 16, wherein the first subwoofer processed signal and the second subwoofer processed signal are produced by being processed by any one selected from the group: a high pass filter, a low pass filter, an equaliser, and a dynamic range control.

18. The method according to claim 17, wherein the low pass filter has a cut-off frequency of 70-200Hz.

19. The method according to any one of claims 12 to 18, wherein the audio signal is transmitted to the speaker wirelessly.

20. The method according to any one of claims 12 to 19, wherein processing separately and independently the L and R signals comprises processing separately and independently either a combination of or only the L and R signals to produce the processed L and R signals.

21. The method according to claim 12, further comprising

summing the received L and R channel signals to produce a main subwoofer signal;

generating a processed signal by passing the main subwoofer signal through a series of components for digital signal processing, the components comprising a Low Pass Filter, a High Pass Filter, an Equaliser Filter and a Dynamic Range Control; and

dividing the processed signal to produce the first subwoofer processed signal and the second subwoofer processed signal.

22. A surround sound system, the system comprising a transmitter for transmitting the audio signal to the speaker according to any one of claims 1 to 11.

23. The system according to claim 22, wherein the system comprises 7 speakers.

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24. The system according to claim 23, wherein the speakers are located in a single speaker enclosure.