

LOUDSPEAKER ROOM INTERFACE SURROUND SOUND SPEAKER SYSTEM

Field of the Invention

5 The present invention relates to a surround sound
speaker system for enhancing the spatial surround sound
from a stereo system that has existing front left and
right speaker boxes. The invention provides a method of
enhancing the sound of an existing stereo system and a kit
10 for enhancing a stereo speaker system using the method.

A number of systems have been proposed which
attempt to improve the listening experience, most of these
systems, such as dolby surround sound, require complicated
15 processing equipment and cannot be added to an existing
stereo system that has existing front left and right
speaker boxes.

Accordingly, it would be advantageous to provide
20 an alternative surround sound speaker system.

Disclosure of the Invention

Accordingly, the invention provides a surround
25 sound speaker system for enhancing the spatial surround
sound from a stereo system that has existing front left
and right speaker boxes located in a listening area having
a front, a rear, and left and right sides, said surround
sound speaker system having:

30 a left side speaker box for location on the left
side of said listening area about half way between the
front and the rear of said listening area, left side
switching means for selectively switching a speaker driver
of the left side speaker box to a pair of the left
35 positive, left negative, and right positive of the speaker
outputs of the channels of an amplifier of said stereo
system, to allow alternative selective pair connections of

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output signals from the left positive, left negative and right positive channels;

5 a right side speaker box for location on the right side of said listening area about half way between the front and the rear of said listening area, right side switching means for selectively switching a speaker driver of the right side speaker box to a pair of the right positive, right negative and left positive of the speaker outputs of channels of said amplifier, to allow
10 alternative selective pair connections of signals from the right positive, right negative and left positive channels; and

a rear speaker box for location to the rear of said listening area, a speaker driver thereof being
15 connectable to the speaker outputs of the left and right positive channels of said amplifier,

whereby all of said speaker boxes are, in use, interconnectable to provide a spatial surround sound field in said listening area, and wherein different spatial
20 surround fields can be obtained by switching said left side switching means and said right side switching means to provide different pairs of connections of the loud speakers of the left side speaker box and the right side speaker box.

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The invention also provides a method of enhancing spatial surround sound from a stereo system that has existing front left and right speaker boxes located in a listening area having a front, a rear, and left and right
30 sides, said method involving locating a further left speaker box on the left side of a listening area about half way between the front and rear of the listening area, the speaker driver of the further left side speaker box being selectively connectable to a pair of the left
35 positive, left negative and right positive of the speaker outputs of the channels of an amplifier of said stereo system, through a switching means to allow alternative

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selective pair connections of output signals from the left positive, left negative and right positive channels;

5 locating a further right side speaker box on the right side of said listening area about half way between the front and rear of said listening area, the speaker driver of the further right speaker box being selectively connectable to a pair of the right positive, right negative, and left positive of the speaker outputs of the channels of said amplifier through further switching means
10 to allow alternative selective pair connections of signals from the right positive, right negative, and left positive channels; and

locating a rear speaker box to the rear of said listening area, and connecting a speaker driver of the
15 rear speaker box to the speaker outputs of the left and right positive channels of the amplifier, and connecting all of the speaker boxes to provide a spatial surround sound field in said listening area, wherein different spatial surround sound fields can be obtained by switching
20 said switching means and said further switching means to provide different pairs of connections of the further left side speaker box and the further right side speaker box.

Embodiments of the present invention provide a
25 cost effective solution to providing enhanced spatial listening experience. With the system of embodiments of the invention in place, the listeners should perceive more of the reverberance and ambience of the original recording because of the use of the additional speakers, their
30 configuration and placement.

Brief Description of the Drawings

A preferred embodiment of the present invention
35 will now be described in relation to the following drawings in which:

Figure 1 is a schematic diagram showing the

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surround sound speaker system of the preferred embodiment;

Figure 2 shows a first selectable connection of the left and right speaker boxes of the surround sound system;

5 Figure 3 shows a second selectable connection of the left and right speaker boxes; and

Figure 4 shows a third selectable speaker connection.

10 Description of the Preferred Embodiment

Figure 1 illustrates how the surround sound speaker system of the preferred embodiment is connected to an existing amplifier 1 in the listening area 2.

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The amplifier 1 is connected to existing left front and right front speaker boxes which are not illustrated for the sake of clarity of representation. The existing speakers are located toward the front 4 of listening area 2. The front 4, left side 5, right side 6, and rear 7 of the listening area 2 are defined relative to a listening position 3 where a person should place themselves in order to enjoy the best spatial sound experience.

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The surround sound speaker system consists of a left side speaker box 15 for location on the left side 5 of the listening area 2 about half way between the front and the rear 7 of the listening area; a right side speaker box 16 for location on the right side 6 of the listening area about half way between the front 4 and rear of the listening area 2; and a rear speaker box 17 for location to the rear 7 of the listening area, about half way between the left side 5 and right side 6. Speaker boxes 15, 16, 17 are connected to the existing channel outputs of the amplifier 1. Herein, these outputs are referred to as the left positive (L+) 10, the left negative (L-) 11,

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the right negative (R-) 12, and right positive (R+) 13 channels.

As shown in Figure 1, in the preferred
5 embodiment, the left and right side speaker boxes are each
connected to three of the four amplifier channels 10, 11,
12, 13 to enable alternative settings to be chosen to
provide the optimum listening experience. Thus the left
side speaker box 15 is connected to the right positive
10 channel 13, the left positive channel 10 and the left
negative channel 11 of the amplifier 1 by appropriate
cabling. Left side switching means is contained within
the left side speaker box 15 for connecting these channels
to the positive and negative terminals of the speaker
15 drivers.

Herein the term "speaker driver" is used to refer
to the device which is used to turn the electrical signals
from the amplifier into sound waves and which may take any
20 suitable form for doing so. A typical speaker driver
consists of a diaphragm and a voice coil for driving the
diaphragm.

Similarly, the right side speaker box is
25 connected to the L+ channel 10, R+ channel 13 and R-
channel 12 and contains right side switching means.
Further details of how the left and right side switching
means are used to form different connections are contained
below. Each of the left and rear right side speaker boxes
30 15, 16 have connection selecting switches 20a, 20b to
enable the different connections to be selected.

The left side speaker box has a L+ channel output
23 and the right speaker box has a R+ output. These
35 outputs are connected to the rear speaker 17. While it is
preferred that these L+ and R+ of output connections 23,
24 are used to connect the amplifier to the rear speaker

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via the left and right side speakers 15, 16 respectively, it will be apparent to persons skilled in the art that it is possible to connect the rear speaker 17 directly to the amplifier.

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In the preferred embodiment, each speaker box 15, 16 and 17 contains at least two speaker drivers, with at least one speaker driver facing in each of one of a first and second direction. In the embodiments shown in Figures 2, 3 and 4 a single speaker driver is illustrated, facing in each of the two different directions. However it will be appreciated that depending on the speaker characteristics, in order to provide an appropriate sound output there may be a plurality of speaker drivers on each side of the speaker box. Irrespective of the number of speaker drivers, it is preferred that the speaker drivers facing in the two different directions are arranged in mirrored relationship to the other about a plane of symmetry midway between the speaker drivers.

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The first selectable connection is an out-of-phase series connection of the drivers. In this connection, a first speaker driver 26 of the left side speaker 15 faces the front 4 of the listening area. The positive terminal 32 of first speaker driver 26 is connected to the L+ channel 10 of the amplifier 1. The negative terminal 33 of first speaker driver 26 is connected to the negative terminal of second speaker driver 27 which faces the rear of the room, and the positive terminal of second speaker driver 27 is connected to the left negative channel of the amplifier 1.

As also shown in Figure 2 the right side speaker 16 is connected with third speaker driver 29 facing the front of the listening area and fourth speaker driver 30 facing the rear of the speaker area. The right side speaker is wired with the R+ terminal 37 of the third

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speaker connected to the R+ terminal 13 of the amplifier,
the negative terminal 38 of third speaker driver 29 wired
to the negative terminal 40 of fourth speaker driver 30,
and the positive terminal 39 of the fourth speaker driver
5 30 wired to the R- channel 12 of the amplifier 1.

A second selectable connection is shown in Figure
3. The left and right side switching means are is
operated in order to connect the speakers in a parallel
10 difference signal connection. Thus, in Figure 3 the left
side speaker 15 is connected with the positive terminal 32
of first speaker driver 26 connected to the L+ channel 10
of the amplifier 1 and with the negative terminal 33 of
first speaker driver 26 connected to the R+ channel 13.
15 At the same time, the positive terminals of first and
second speaker drivers 26, 27 are connected to each other
as are the negative terminals 33, 35 of first and second
speaker drivers 26, 27.

20 Similarly, the right side speaker box 16 has the
terminals of third speaker driver 29 connected with the
positive terminal 37, connected to the R+ channel 13 of
the amplifier 1 and the negative terminal 38 connected to
the L+ channel 10 of the amplifier 1. The positive
25 terminals 37, 39 of third and fourth speaker drivers 29
and 30 are connected to one another as are the negative
terminals 38, 40; which are the same connections as are
made with the left side speaker box.

30 A third selectable connection is shown in Figure
4 which is a series different signal connection. In this
position the positive terminal 32 of first speaker driver
26 is connected to the L+ channel 10 of the amplifier.
The negative terminal of first speaker driver 26 is
35 connected to the positive terminal 34 of second speaker
driver 27 and the negative terminal 35 is connected to the
R+ channel 13 of the amplifier 1.

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The right side speaker is selectively connected using the right side switching means in an analogous manner so that the positive terminal 37 of third speaker driver 29 is connected to the right positive channel 13 of the amplifier 1, the negative terminal 38 of third speaker driver 29 is connected to the positive terminal 39 of fourth speaker driver 30 and the negative terminal 40 of fourth speaker driver 30 is connected to the L+ channel 10 of amplifier 1.

Irrespective of the switching of the left and right side channels, the rear speaker 17 is connected to the L+ 10 and R+ 13 channels of the amplifier 1. As with the left and right side speaker boxes, the rear speaker box has at least two speaker drivers facing one in one direction and the other in another direction so that one faces generally towards the right side of the listening area and one faces generally towards the left side of the listening area. That is the plane of symmetry between the speaker drivers facing in different directions is oriented generally transverse to the front of the listening area. The positive terminal of the speaker driver facing the right side of listening area 2 is connected to the R+ channel of the amplifier. Similarly, the positive terminal of the speaker driver facing the left side of the room is connected to the L+ channel 10 of amplifier 1. The negative terminals of the two or more speaker drivers of the rear speaker 17 facing in opposite directions are connected to one another.

It will be apparent that in each of the speaker boxes, the speaker drivers are at an angle. It is believed that these angles lead to optimum sound translation within the room by summation and cancellation of sound waves. In the preferred embodiment angle α is chosen to be 60° . This leads to there being an angle of

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30° between the plane in which each speaker driver is located and the plane of symmetry between a pair speaker drivers contained within the same speaker box. In other embodiments, other angles may be acceptable such that
5 angles in the range of 10° and 70° relative to the plane of symmetry may be acceptable in some embodiments.

In the illustrated embodiment, the right side and left side speaker boxes are arranged such that the speaker
10 drivers are angled towards the left side 5 and right side 6 of the listening area respectively. Similarly, the rear centre speaker box 17 is arranged such that the speaker drivers are angled away from the rear of the listening area 7.

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In other embodiments, in order to improve the spatial surround sound of the listening area, it is possible that the arrangement may be reversed or altered such that, for example, the left and right side speaker
20 boxes 15, 16 are arranged so that the speaker drivers 26, 27, 29, 30 angle out from the sides of the listening area and the speaker drivers of the rear speaker box angle into wall.

25 It will be apparent that the present invention provides a method for enhancing spatial surround sound by properly locating speaker boxes within the area 2. It is also apparent that the invention could be supplied of a kit comprising left 15, right 16 and rear 17 speaker boxes
30 17 can be supplied as a kit together with instructions for using them in accordance with the method of the invention.

It will be noted that both the left and right side speaker boxes are provided with a volume control 21
35 which allows the volume to be adjusted separately from the amplifier.

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LED 22 is provided in order to allow a user to tell whether the speaker is operating and flashes dynamically according to signal strength. Although not provided in the preferred embodiment, similar volume
5 adjustment may be provided for the rear speaker 17 if desired.

These and various modifications will be apparent to persons skilled in the art and should be understood as
10 falling within the scope of the invention.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A surround sound speaker system for enhancing the spatial surround sound from a stereo system that has
5 existing front left and right speaker boxes located in a listening area having a front, a rear, and left and right sides, said surround sound speaker system having:
 - a left side speaker box for location on the left side of said listening area about half way between the
10 front and the rear of said listening area, left side switching means for selectively switching a speaker driver of the left side speaker box to a pair of the left positive, left negative, and right positive of the speaker outputs of the channels of an amplifier of said stereo
15 system, to allow alternative selective pair connections of output signals from the left positive, left negative and right positive channels;
 - a right side speaker box for location on the right side of said listening area about half way between
20 the front and the rear of said listening area, right side switching means for selectively switching a speaker driver of the right side speaker box to a pair of the right positive, right negative and left positive of the speaker outputs of channels of said amplifier, to allow
25 alternative selective pair connections of signals from the right positive, right negative and left positive channels; and
 - a rear speaker box for location to the rear of said listening area, a speaker driver thereof being
30 connectable to the speaker outputs of the left and right positive channels of said amplifier,
- whereby all of said speaker boxes are, in use, interconnectable to provide a spatial surround sound field in said listening area, and wherein different spatial
35 surround fields can be obtained by switching said left side switching means and said right side switching means to provide different pairs of connections of the loud

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speakers of the left side speaker box and the right side speaker box.

2. A surround sound speaker system as claimed in claim 1, wherein each of the left and right speaker boxes contains a plurality of speaker drivers, with at least one speaker driver facing in one different direction and another speaker driver facing in a different direction.

3. A surround sound speaker system as claimed in claim 2, wherein one direction of said two different directions is generally towards the front of the listening area and another direction is generally towards the rear of the listening area.

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4. A surround sound speaker system as claimed in claim 2, wherein said speaker drivers facing in each of said two different directions, are arranged in mirrored relationship to one another.

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5. A surround sound speaker system as claimed in claim 4, wherein a plane of symmetry between said speaker drivers facing in each of said two different directions is arranged to be approximately parallel to the front of said listening area.

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6. A surround sound speaker system as claimed in claim 4, wherein said speaker drivers facing in said two different directions are both oriented at an angle of between 10° and 70° relative to a plane of symmetry between said speakers.

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7. A surround sound speaker system as claimed in claim 4, wherein said speaker drivers are both oriented at an angle of approximately 30° relative to said plane of symmetry.

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8. A surround sound speaker system as claimed in claim 6, wherein said speaker drivers are angled towards a side of the listening area.

5 9. A surround sound speaker system as claimed in claim 8, wherein said speaker drivers are angled away from a side of the listening area.

10 10. A surround sound speaker system as claimed in claim 2, wherein each speaker driver has a positive and a negative terminal, and the speaker drivers are connected in out-of-phase series connection, wherein:

the positive terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the left positive channel of the amplifier;

the negative terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the negative channel of the speaker driver or speaker drivers facing the rear of the listening area;

the positive terminal of the left speaker driver or speaker drivers facing the rear of the listening area is/are connected to the left negative channel of the amplifier;

the positive terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

30 the negative terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to the negative channel of the right speaker driver or speaker drivers facing the rear of the listening area; and

35 the positive terminal of the right speaker driver or speaker drivers facing the rear of the listening area is/are connected to the right negative channel of the

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amplifier.

11. A surround sound speaker system as claimed in claim 2, wherein each speaker driver has a positive and a negative terminal, and the speaker drivers are connected in parallel difference signal connection, wherein:

the positive terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the left positive channel of the amplifier;

the negative terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

the positive and negative terminals of the left speaker driver or speaker drivers facing the front of the listening area are connected, respectively, to the positive and negative terminals of the left speaker driver or speaker drivers facing the rear of the listening area;

the positive terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

the negative terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to left positive channel of the amplifier; and

the positive and negative terminals of the right speaker driver or speaker drivers facing the front of the listening area are connected, respectively, to the positive and negative terminals of the right speaker driver or speaker drivers facing the rear of the listening area.

12. A surround sound speaker system as claimed in claim 2, wherein each speaker driver has a positive and a negative terminal, and the speaker drivers are connected

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in a series difference signal connection, wherein:

the positive terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the left positive channel of the

5 amplifier;

the negative terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the positive terminal of the speaker driver or speaker drivers facing the rear of the listening

10 area;

the negative terminal of the left speaker driver or speaker drivers facing the rear of the listening area is/are connected to the right positive channel of the amplifier;

15 the positive terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

the negative terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to the positive terminal of the right speaker driver or speaker drivers facing the rear of the listening area; and

20 the negative terminal of the right speaker driver or speaker drivers facing the rear of the listening area is/are connected to the left positive channel of the amplifier.

13. A surround sound speaker system as claimed in claim 1, wherein said rear speaker box contains a plurality of speaker drivers with at least one speaker driver facing in one direction and another speaker driver facing in a different direction.

30 14. A surround sound speaker system as claimed in claim 13, wherein said speaker drivers of said rear speaker facing in different directions are arranged in a

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mirrored relationship.

15. A surround sound speaker system as claimed in claim 14, wherein a plane of symmetry between said speaker
5 drivers facing in each of said two different directions is arranged transverse to the front of said listening area.

16. A surround sound speaker system as claimed in claim 14, wherein said speaker drivers of said rear
10 speaker box facing in two different directions are oriented at an angle of between 10° and 70° relative to a plane of symmetry between said speaker drivers.

17. A surround sound speaker system as claimed in claim 16, wherein said speaker drivers of said rear
15 speaker box are oriented at an angle of approximately 30°.

18. A surround sound speaker system as claimed in claim 16, wherein said speaker drivers of said rear
20 speaker box are angled so as to face the rear of the listening area.

19. A surround sound speaker system as claimed in claim 16, wherein said speaker drivers of said rear
25 speaker box are angled so as to face the front of the listening area.

20. A surround sound speaker system as claimed in claim 13, wherein each speaker driver of said rear speaker
30 box has positive and negative terminals, and the rear speaker is connected with:

the positive terminal of the rear speaker driver or speaker drivers facing the right side of the listening area connected to the right positive channel of the
35 amplifier,

the positive terminal of the rear speaker driver of speaker drivers facing the left side of the listening

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area connected to the left positive channel of the amplifier, and

the negative terminal of the rear speaker driver or speaker drivers facing the left of the listening area
5 connected to the negative terminal of the rear speaker driver or speaker drivers facing the right of the listening area.

21. A method of enhancing spatial surround sound from
10 a stereo system that has existing front left and right speaker boxes located in a listening area having a front, a rear, and left and right sides, said method involving locating a further left speaker box on the left side of a listening area about half way between the front and rear
15 of the listening area, the speaker driver of the further left side speaker box being selectively connectable to a pair of the left positive, left negative and right positive of the speaker outputs of the channels of an amplifier of said stereo system, through a switching means
20 to allow alternative selective pair connections of output signals from the left positive, left negative and right positive channels;

locating a further right side speaker box on the right side of said listening area about half way between
25 the front and rear of said listening area, the speaker driver of the further right speaker box being selectively connectable to a pair of the right positive, right negative, and left positive of the speaker outputs of the channels of said amplifier through further switching means
30 to allow alternative selective pair connections of signals from the right positive, right negative, and left positive channels; and

locating a rear speaker box to the rear of said listening area, and connecting a speaker driver of the
35 rear speaker box to the speaker outputs of the left and right positive channels of the amplifier, and connecting all of the speaker boxes to provide a spatial surround

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sound field in said listening area, wherein different spatial surround sound fields can be obtained by switching said switching means and said further switching means to provide different pairs of connections of the further left side speaker box and the further right side speaker box.

22. A method as claimed in claim 21, wherein each further speaker box contains a plurality of speaker drivers, with at least one speaker facing one direction and another speaker facing in a different direction so that the speakers facing each of the two different directions are arranged in mirrored relationship around a plane of symmetry, and said method involves locating said further left and right side speaker boxes with the plane of symmetry approximately parallel to the front of said listening area.

23. A method as claimed in claim 22, wherein said speaker drivers facing in said two different directions are oriented at an angle of between 10° and 70° relative to said plane of symmetry and said method involves locating said speaker box so that said speaker drivers are angled towards the sides of the listening area.

24. A method as claimed in claim 23, wherein said speaker drivers facing in said two different directions are both oriented at an angle of between 10° and 70° relative to a plane of symmetry between said speaker driver, and said speaker drivers are arranged to be angled out away from said sides of said listening area.

25. A method as claimed in claim 21, wherein each speaker driver has a positive and a negative terminal and the method involves connecting the speakers in out of phase series connection, wherein:

the positive terminal of the left speaker driver or speaker drivers facing the front of the listening area



is/are connected to the left positive channel of the amplifier;

the negative terminal of the left speaker driver or speaker drivers facing the front of the listening area
5 is/are connected to the negative channel of the speaker driver or speaker drivers facing the rear of the listening area;

the positive terminal of the left speaker driver or speaker drivers facing the rear of the listening area
10 is/are connected to the left negative channel of the amplifier;

the positive terminal of the right speaker driver or speaker drivers facing the front of the listening area
is/are connected to the right positive channel of the
15 amplifier;

the negative terminal of the right speaker driver or speaker drivers facing the front of the listening area
is/are connected to the negative channel of the right
speaker driver or speaker drivers facing the rear of the
20 listening area; and

the positive terminal of the right speaker driver or speaker drivers facing the rear of the listening area
is/are connected to the right negative channel of the
amplifier.

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26. A method as claimed in claim 21 wherein each speaker driver has a positive and negative speaker terminal, and the method involves connecting the speakers in parallel difference signal connection, wherein:

30 the positive terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the left positive channel of the amplifier;

the negative terminal of the left speaker driver
35 or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

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the positive and negative terminals of the left speaker driver or speaker drivers facing the front of the listening area are connected, respectively, to the positive and negative terminals of the left speaker driver or speaker drivers facing the rear of the listening area;

the positive terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

the negative terminal of the right speaker driver or speaker drivers facing the front of the listening area is/are connected to left positive channel of the amplifier; and

the positive and negative terminals of the right speaker driver or speaker drivers facing the front of the listening area are connected, respectively, to the positive and negative terminals of the right speaker driver or speaker drivers facing the rear of the listening area.

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27. A method as claimed in claim 21 wherein each speaker driver has a positive and a negative terminal, and the method involves connecting the speaker drivers in a series different signal connection, wherein:

the positive terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the left positive channel of the amplifier;

the negative terminal of the left speaker driver or speaker drivers facing the front of the listening area is/are connected to the positive terminal of the speaker facing the rear of the listening area;

the negative terminal of the left speaker driver or speaker drivers facing the rear of the listening area is/are connected to the right positive channel of the amplifier;

the positive terminal of the right speaker driver

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or speaker drivers facing the front of the listening area is/are connected to the right positive channel of the amplifier;

the negative terminal of the right speaker driver
5 or speaker drivers facing the front of the listening area is/are connected to the positive terminal of the right speaker driver or drivers facing the rear of the listening area; and

the negative terminal of the right speaker driver
10 or speaker drivers facing the rear of the listening area is/are connected to the left positive channel of the amplifier.

28. A method as claimed in claim 21 wherein the rear
15 speaker box contains a plurality of speaker drivers with at least one speaker driver facing in one direction and another speaker driver facing in a different direction and arranged in mirror relationship to one another about a plane of symmetry, and said rear speaker box is arranged
20 with said plane of symmetry transverse to the front of said listening area.

29. A kit comprising further left and right speaker
boxes and a rear speaker box which may be connected using
25 the method of claim 21 in order to enhance the spatial surround sound from the stereo system that has existing front and left right speaker boxes.

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