Claims

1. Method for mapping a plurality of input channels of an input channel configuration (404) to output channels of an output channel configuration (406), the method comprising:

providing a set of rules (400) associated with each input channel of the plurality of input channels, wherein the rules define different mappings between the associated input channel and a set of output channels;

for each input channel of the plurality of input channels, accessing (500) a rule associated with the input channel, determining (502) whether the set of output channels defined in the accessed rule is present in the output channel configuration (406), and selecting (402, 504) the accessed rule if the set of output channels defined in the accessed rule is present in the output channel configuration (406); and

mapping (508) the input channels to the output channels according to the selected rule,

wherein the rules in the sets of rules are prioritized, wherein higher prioritized rules are selected with higher preference over lower prioritized rules, and comprising at least one of:

wherein a rule defining mapping of the input channel to one or more output channels having a lower direction deviation from the input channel in a horizontal listener plane is higher prioritized than a rule defining mapping of the input channel to one or more output channels having a higher direction deviation from the input channel in the horizontal listener plane,

wherein a rule defining mapping an input channel to one or more output channels having a same elevation angle as the input channel is higher prioritized than a rule defining mapping of the input channel to one or more output channels having an elevation angle different from the elevation angle of the input channel,

wherein, in the sets of rules, the highest prioritized rule defines direct mapping between the input channel and an output channel, which have the same direction, and

wherein one rule of a set of rules associated with an input channel having an elevation angle of 90° defines mapping the input channel to all available output channels having a first elevation angle lower than the elevation angle of the input channel, and another less prioritized rule of that set of rules defines mapping the input channel to all available output channels having a second elevation angle lower than the first elevation angle.

2. Method of claim 1, comprising not selecting the accessed rule if the set of output channels defined in the accessed rule is not present in the output channel configuration (406) and repeating the steps of accessing, determining and selecting for at least one other rule associated with the input channel.

3. Method of ~~one of~~ claims ~~1 or 2~~, wherein the rules define at least one of a gain coefficient to be applied to the input channel, a delay coefficient to be applied to the input channel, a panning law to be applied to map an input channel to two or more output channels, and a frequency-dependent gain to be applied to the input channel.

4. Method of ~~one of~~ claims ~~1 to 3~~, comprising accessing the rules in the sets of rules in a specific order until it is determined that the set of output channels defined in an accessed rule is present in the output channel configuration (406) such that prioritization of the rules is given by the specific order.

5. Method of ~~one of~~ claims ~~1 to 4~~, wherein a rule supposed to deliver higher sound quality is higher prioritized than a rule supposed to deliver lower sound quality.

6. Method of ~~one of~~ claims ~~1 to 5~~, wherein, in the sets of rules, the highest prioritized rule defines direct mapping between the input channel and an output channel, which have the same direction, the method comprising, for each input channel, checking whether an output channel comprising the same direction as the input channel is present in the output channel configuration (406) before accessing a

memory (422) storing the other rules of the set of rules associated with each input channel.

7. Method of ~~one of~~ claims 1 ~~to 6~~, wherein, in the sets of rules, the lowest prioritized rule defines mapping of the input channel to one or both output channels of a stereo output channel configuration having a left output channel and a right output channel.

8. Method of ~~one of~~ claims 1 ~~to 7~~, wherein one rule of a set of rules associated with an input channel having a direction different from a front center direction defines mapping the input channel to two output channels located on the same side of the front center direction as the input channel and located on both sides of the direction of the input channel, and another less prioritized rule of that set of rules defines mapping the input channel to a single output channel located on the same side of the front center direction as the input channel.

9. Method of ~~one of~~ claims 1 ~~to 8~~, wherein a rule of a set of rules associated with an input channel comprising a front center direction defines mapping the input channel to two output channels, one located on the left side of the front center direction and one located on the right side of the front center direction.

10. Method for mapping a plurality of input channels of an input channel configuration (404) to output channels of an output channel configuration (406), the method comprising:

providing a set of rules (400) associated with each input channel of the plurality of input channels, wherein the rules define different mappings between the associated input channel and a set of output channels;

for each input channel of the plurality of input channels, accessing (500) a rule associated with the input channel, determining (502) whether the set of output channels defined in the accessed rule is present in the output channel configuration (406), and selecting (402, 504) the accessed rule if the set of output channels defined in the accessed rule is present in the output channel configuration (406); and

mapping (508) the input channels to the output channels according to the selected rule,

wherein a rule of a set of rules associated with an input channel comprising a rear center direction defines mapping the input channel to two output channels, one located on the left side of a front center direction and one located on the right side of the front center direction, wherein the rule further defines using a gain coefficient of less than one if an angle of the two output channels relative to the rear center direction is more than 90°.

11. Method of ~~one of~~ claims ~~1 to 10~~, wherein a rule of a set of rules associated with an input channel having a direction different from a front center direction defines using a gain coefficient of less than one in mapping the input channel to a single output channel located on the same side of the front center direction as the input channel, wherein an angle of the output channel relative to a front center direction is less than an angle of the input channel relative to the front center direction.

12. Method of ~~one of~~ claims ~~1 to 11~~, wherein a rule defining mapping an input channel having an elevation angle to one or more output channels having an elevation angle lower than the elevation angle of the input channel defines using a gain coefficient of less than one.

13. Method of ~~one of~~ claims ~~1 to 12~~, wherein a rule defining mapping an input channel having an elevation angle to one or more output channels having an elevation angle lower than the elevation angle of the input channel defines applying a frequency selective processing.

14. Method of ~~one of~~ claims ~~1 to 13~~, comprising receiving input audio signals associated with the input channels, wherein mapping (508) the input channels to the output channels comprises evaluating (410, 520) the selected rules to derive coefficients to be applied to the input audio signals and applying (524) the coefficients to the input audio signals in order to generate output audio signals associated with the output channels, and outputting (528) the output audio signals to loudspeakers associated with the output channels.

15. Method of claim 14, comprising generating a downmix matrix (414) and applying the downmix matrix (414) to the input audio signals.

16. Method of claim 14 ~~or 15~~, comprising applying trim delays and trim gains to the output audio signals in order to reduce or compensate for differences between distances of the respective loudspeakers from the central listener position in the input channel configuration (404) and the output channel configuration (406).

17. Method of ~~one of~~ claims 14 ~~to 16~~, comprising taking into consideration a deviation between a horizontal angle of an output channel of a real output configuration and a horizontal angle of a specific output channel defined in the set of rules when evaluating a rule defining mapping of an input channel to one or two output channels including the specific output channel, wherein the horizontal angles represent angles within a horizontal listener plane relative to a front center direction.

18. Method of ~~one of~~ claims 14 ~~to 17~~, comprising modifying a gain coefficient, which is defined in a rule defining mapping an input channel having an elevation angle to one or more output channels having elevation angles lower than the elevation angle of the input channel, to take into consideration a deviation between an elevation angle of an output channel of a real output configuration and an elevation angle of one output channel defined in that rule.

19. Method of ~~one of~~ claims 14 ~~to 18~~, comprising modifying a frequency selective processing defined in a rule defining mapping an input channel having an elevation angle to one or more output channels having elevation angles lower than the elevation angle of the input channel, to take into consideration a deviation between an elevation angle of an output channel of a real output configuration and an elevation angle of one output channel defined in that rule.

20. Computer program for performing, when running on a computer or a processor, the method of one of claims 1 to 19.

21. A signal processing unit (420) comprising a processor (422) configured or programmed to perform a method according to one of claims 1 to 19.

22. The signal processing unit of claim 21, further comprising:

an input signal interface (426) for receiving input signals (228) associated with the input channels of the input channel configuration (404), and

an output signal interface (428) for outputting output audio signals associated with the output channel configuration (406).

23. An audio decoder comprising a signal processing unit according to claim 21 or 22.