

CLAIMS

1. A device configured to decode a bitstream representative of a higher order ambisonic audio signal, the device comprising:

a memory configured to store the bitstream representative of the higher order ambisonic audio signal; and

one or more processors configured to:

obtain an indication of a total number of channels specified in the bitstream;

obtain, from the bitstream, an indication of a number of channels specified in each of one or more layers in the bitstream; and

obtain the channels specified in the one or more layers in the bitstream based on the indication of the number of channels specified in each of the one or more layers and the indication of the total number of channels specified in the bitstream.

2. The device of claim 1,

wherein the one or more processors are further configured to obtain an indication of a type of one of the channels specified in the one or more layers in the bitstream, and

wherein the one or more processors are configured to obtain the one of the channels based on the indication of the number of channels specified in each of the one or more layers, the indication of the total number of channels specified in the bitstream, and the indication of the type of the one of the channels.

3. The device of claim 1,
wherein the one or more processors are further configured to obtain an indication of a type of one of the channels specified in the one or more layers in the bitstream, the indication of the type of the one of the channels indicating that the one of the channels is a foreground channel, and
wherein the one or more processors are configured to obtain the one of the channels based on the indication of the number of channels specified in each of the one or more layers, the indication of the total number of channels specified in the bitstream, and the indication that the type of the one of the channels is the foreground channel.
4. The device of claim 1,
wherein the processors are further configured to obtain an indication of a number of layers specified in the bitstream, and
wherein the processors are configured to obtain the one of the channels based on the indication of the number of channels specified in each of the one or more layers, the indication of the total number of channels specified in the bitstream, and the indication of the number of layers.
5. The device of claim 4,
wherein the indication of the number of layers comprises an indication of a number of layers in a previous frame of the bitstream,
wherein the one or more processors are further configured to obtain an indication of whether the number of channels specified in one or more layers in the bitstream has changed in a current frame when compared to a number of channels specified in one or more layers in the bitstream of the previous frame, and

wherein the processors are configured to obtain the one of the channels based on the indication of whether the number of channels specified in one or more layers in the bitstream has changed in the current frame.

6. The device of claim 4, wherein the one or more processors are further configured to determine the number of channels specified in the one or more layers of the bitstream in the current frame as the same as the number of channels specified in the one or more layers of the bitstream in the previous frame when the indication indicates that the number of channels specified in the one or more layers of the bitstream has not changed in the current frame when compared to the number of channels specified in the one or more layers of the bitstream in the previous frame.

7. The device of claim 4, wherein the one or more processors are further configured to, when the indication indicates that the number of channels specified in the one or more layers of the bitstream has not changed in the current frame when compared to the number of channels specified in the one or more layers of the bitstream in the previous frame, obtain an indication of a current number of channels in one or more of the layers for the current frame to be the same as a previous number of channels in one or more of the layers of the previous frame.

8. The device of claim 1, further comprising a loudspeaker configured to reproduce a soundfield based on the higher order ambisonic audio signal.

9. A method of decoding a bitstream representative of a higher order ambisonic audio signal, the method comprising:

- obtaining an indication of a total number of channels specified in the bitstream;
- obtaining, from the bitstream representative of the higher order ambisonic audio signal, an indication of a number of channels specified in each of one or more layers in the bitstream; and
- obtaining the channels specified in the one or more layers in the bitstream based on the indication of the number of channels specified in each of the one or more layers and the indication of the total number of channels specified in the bitstream.

10. The method of claim 9, further comprising obtaining an indication of a type of one of the channels specified in the one or more layers in the bitstream, the indication of the type of the one of the channels indicating that the one of the channels is a background channel,

- wherein obtaining the channels comprises obtaining the one of the channels based on the indication of the number of channels specified in each of the one or more layers, the indication of the total number of channels specified in the bitstream, and the indication that the type of the one of the channels is the background channel.

11. The method of claim **10**, further comprising obtaining an indication of a type of one of the channels specified in the one or more layers in the bitstream, the indication of the type of the one of the channels indicating that the one of the channels is a background channel,

wherein obtaining the channels comprises obtaining the one of the channels based on the indication of the number of layers specified in each of the one or more layers, the indication of the total number of channels specified in the bitstream, and the indication that the type of the one of the channels is the background channel.

12. The method of claim **10**, wherein the one of the channels comprises a background higher order ambisonic coefficient.

13. The method of claims **10**, wherein obtaining the indication of the type of the one of the channels comprises obtaining a syntax element indicative of the type of the one of the channels.

14. The method of claim **9**, wherein obtaining the indication of the number of channels comprises obtaining the indication of the number of channels based on a number of channels remaining in the bitstream after one of the layers is obtained.

15. The method of claim **9**, wherein the layers comprise a base layer.

16. The method of claim **9**, wherein the layers comprises a base layer and one or more enhancement layers.

17. The method of claim **9**, wherein a number of the one or more layers is fixed.

18. A device configured to decode a bitstream representative of a higher order ambisonic audio signal, the device comprising:

- means for obtaining an indication of a total number of channels specified in the bitstream;
- means for obtaining, from the bitstream representative of the higher order ambisonic audio signal, an indication of a number of channels specified in each of one or more layers of the bitstream; and
- means for obtaining the channels specified in the one or more layers in the bitstream based on the indication of the number of channels specified in each of the one or more layers and the indication of the total number of channels specified in the bitstream.

19. A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause one or more processors to:

- obtain, from a bitstream representative of a higher order ambisonic audio signal, an indication of a total number of channels specified in the bitstream;
- obtain, from the bitstream, an indication of a number of channels specified in each of one or more layers of the bitstream; and
- obtain the channels specified in the one or more layers of the bitstream based on the indication of the number of channels specified in each of the one or more layers and the indication of the total number of channels specified in the bitstream.

20. A device configured to encode a higher order ambisonic audio signal to generate a bitstream, the device comprising:

one or more processors configured to:

obtain an indication of a total number of channels specified in the bitstream;

specify, in the bitstream, an indication of a number of channels specified in each of one or more layers of the bitstream; and

specify the indicated total number of the channels in the bitstream such that each of the one or more layers includes the indicated number of channels specified in the respective layer; and

a memory configured to store the bitstream.

21. The device of claim **20**,

wherein the one or more processors are further configured to specify an indication of a type of one of the channels specified in the one or more layers in the bitstream, and

wherein the one or more processors are configured to specify the indicated number of the indicated type of the one of the channels in the one or more layers of the bitstream.

22. The device of claim **20**,

wherein the one or more processors are further configured to specify an indication of a type of one of the channels specified in the one or more layers in the bitstream, the indication of the type of the one of the channels indicating that the one of the channels is a foreground channel, and

wherein the one or more processors are configured to specify the foreground channel in the one or more layers of the bitstream.

23. The device of claim **20**, wherein the one or more processors are further configured to specify an indication, in the bitstream, of a number of layers specified in the bitstream.

24. The device of claim **20**, further comprising a microphone configured to capture the higher order ambisonic audio signal.

25. A method of encoding a higher order ambisonic audio signal to generate a bitstream, the method comprising:

obtain an indication of a total number of channels specified in the bitstream,

specifying, in the bitstream, an indication of a number of channels specified in each of one or more layers of the bitstream; and

specifying the indicated total number of the channels in the bitstream such that each of the one or more layers includes the indicated number of channels specified in the respective layer.

26. The method of claim **25**, further comprising specifying an indication of a type of one of the channels specified in the one or more layers in the bitstream, the indication of the type of the one of the channels indicating that the one of the channels is a background channel,

wherein specifying the indicated number of the channels comprises specifying the background channel in the one or more layers of the bitstream.

27. The method of claim **26**, wherein the one of the channels comprises a background higher order ambisonic coefficient.

28. The method of claim **25**, wherein specifying the indication of the number of channels comprises specifying the indication of the number of channels based on a number of channels remaining in the bitstream after one of the layers is specified.