CLAIMS

1. A method for performing gain control on audio signals, the method comprising:

determining downmixed signals associated with one or more downmix channels associated with a current frame of an audio signal to be encoded;

determining whether an overload condition exists for an encoder to be used to encode the downmixed signals for at least one of the one or more downmix channels;

responsive to determining that the overload condition exists, determining a gain parameter for the at least one of the one or more downmix channels for the current frame of the audio signal;

determining at least one gain transition function based on the gain parameter and a gain parameter associated with a preceding frame of the audio signal;

applying the at least one gain transition function to one or more of the downmixed signals; and

encoding the downmixed signals with the at least one gain transition function applied in connection with information indicative of gain control applied to the current frame;

wherein the at least one gain transition function comprises a transitory portion and a steady-state portion, and wherein the transitory portion corresponds to a transition from the gain parameter associated with the preceding frame of the audio signal to the gain parameter associated with the current frame of the audio signal; and wherein a duration of the transitory portion relates to a delay introduced by a codec comprising the encoder.

2. The method of claim 1, wherein the at least one gain transition function is determined using a partial frame buffer.

3. The method of claim 2, wherein determining the at least one gain transition function using the partial frame buffer introduces substantially 0 additional delay.

4. The method of claim 1, wherein the transitory portion has a transitory type of fade in which gain increases over a portion of samples of the current frame responsive to an attenuation associated with the gain parameter of the preceding frame being greater than an attenuation associated with the gain parameter of the current frame.

5. The method of claim 1, wherein the transitory portion has a transitory type of reverse fade in which gain decreases over a portion of samples of the current frame responsive to an attenuation associated with the gain parameter of the preceding frame being less than an attenuation associated with the gain parameter of the current frame.

6. The method of claim 1, wherein the transitory portion is determined using a prototype function and a scaling factor, and wherein the scaling factor is determined based on the gain parameter associated with the current frame and the gain parameter associated with the preceding frame.

7. The method of claim 1, wherein the information indicative of the gain control applied to the current frame comprises information indicative of the transitory portion of the at least one gain transition function.

8. The method of any one of claims 1-7, wherein the at least one gain transition function comprises a single gain transition function applied to all of the one or more downmix channels for which the overload condition exists.

9. The method of any one of claims 1-7, wherein the at least one gain transition function comprises a single gain transition function applied to all of the one or more downmix channels, and wherein the overload condition exists for a subset of the one or more downmix channels.

10. The method of any one of claims 1-7, wherein the at least one gain transition function comprises a gain transition function for each of the one or more downmix channels for which the overload condition exists.

11. The method of claim 9, wherein a number of bits used to encode the information indicative of the gain control applied to the current frame scales substantially linearly, with a number of downmix channels for which the overload condition exists.

12. The method of any one of claims 1-11, further comprising:

determining second downmixed signals associated with the one or more downmix channels associated with a second frame of the audio signal to be encoded;

determining whether an overload condition exists for the encoder for at least one of the one or more downmix channels for the second frame; and

responsive to determining that the overload condition does not exist for the second frame, encoding the second downmixed signals without applying a non-unity gain.

13. The method of claim 12, further comprising setting a flag indicating that gain control is not applied to the second frame, wherein the flag comprises one bit.

14. The method of any one of claims 1-13, further comprising:

determining a number of bits used to encode the information indicative of the gain control applied to the current frame; and

allocating the number of bits from: 1) bits used to encode metadata associated with the current frame; and/or 2) bits used to encode the downmixed signals for encoding of the information indicative of the gain control applied to the current frame.

15. The method of claim 14, wherein the number of bits are allocated from bits used to encode the downmixed signals, and wherein the bits used to encode the downmixed signals are decreased in an order based on spatial directions associated with the one or more downmixed channels.

16. An apparatus configured for implementing the method of any one of claims 1-15.

17. One or more non-transitory media having software stored thereon, the software including instructions for controlling one or more devices to perform the method of any one of claims 1-15.