Accordingly, there is a need for another concept of a bitstream, encoder and decoder, respectively.

Accordingly, ~~it is the object~~ example enbodiments of the present disclosure seek ~~invention~~ to provide a bitstream, an encoder and a decoder which solve the just-outlined problem and allow for obtaining a more efficient way of length information transmission.

This may be ~~object is~~ achieved by the subject matter of the pending independent claims.

The present disclosure ~~invention~~ is based on the finding that frame elements which shall be made available for skipping may be transmitted more efficiently if a default payload length information is transmitted separately within a configuration block, with the length information within the frame elements, in turn, being subdivided into a default payload length flag followed, if the default payload length flag is not set, by a payload length value explicitly coding the payload length of the respective frame element. However, if the default payload length flag is set, an explicit transmission of the payload length may be avoided. Rather, any frame element, the default extension payload length flag of which is set, has the default payload length and any frame element, the default extension payload length flag of which is not set, has a payload length corresponding to the payload length value. By this measure, transmission effectiveness is increased.

In accordance with an embodiment of the present application, the bitstream syntax is further designed to take advantage of the finding that a better compromise between a too high bitstream and decoding overhead on the one hand and flexibility of frame element positioning on the other hand may be obtained if each of the sequence of frames of the bitstream comprises a sequence of N frame elements and, on the other hand, the bitstream comprises a configuration block comprising a field indicating the number of elements N and a type indication syntax portion indicating, for each element position of the sequence of N element positions, an element type out of a plurality of element types with, in the sequences of N frame elements of the frames, each frame element being of the element type indicated, by the type indication portion, for the respective element position at which the respective frame element is positioned within the sequence of N frame elements of the respective frame in the bitstream. Thus, the frames are equally structured in that each frame comprises the same sequence of N frame elements of the frame element type indicated by the type indication syntax portion, positioned within the bitstream in the same sequential order. This sequential order is commonly adjustable for the sequence of frames by use of the type indication syntax portion which indicates, for each element position of the sequence of N element positions, an element type out of a plurality of element types.

By this measure, the frame element types may be arranged in any order, such as at the encoder's discretion, so as to choose the order which is the most appropriate for the frame element types used, for example.

The plurality of frame element types may, for example, include an extension element type with merely frame elements of the extension element type comprising the length information on the length of the respective frame element so that decoders not supporting the specific extension element type, are able to skip these frame elements of the extension element type using the length information as a skip interval length. On the other hand, decoders able to handle these frame elements of the extension element type accordingly process the content or payload portion thereof. Frame elements of other element types may not comprise such length information. If, in accordance with the just mentioned more specific embodiment, the encoder is able to freely position these frame elements of the extension element type within the sequence of frame elements of the frames, buffering overhead at the decoders may be minimized by choosing the frame element type order appropriately and signaling same within the type indication syntax portion.

Accordingly, in one aspect of the present application, there is provided a bit stream comprising a configuration block and a sequence of frames respectively representing consecutive time periods of an audio content, wherein the sequence of frames is a composition of N sequences of frame elements with each frame element being of a respective one of a plurality of element types so that each frame comprises one frame element out of the N sequences of frame elements, respectively, and for each sequence of frame elements, the frame elements are of equal element type relative to each other,

wherein the configuration block comprises, for at least one of the sequences of frame elements, a default payload length information on a default payload length, and

wherein each frame element of the at least one of the sequences of frame elements, comprises a length information comprising, for at least a subset of the frame elements of the at least one of the sequences of frame elements, a default payload length flag followed, if the default payload length flag is not set, by a payload length value,

wherein any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is set, has the default payload length, and any frame element of the at least one of the sequences of frame elements, the default

extension payload length flag of which is not set, has a payload length corresponding to the payload length value.

In another aspect, there is provided a decoder for decoding a bitstream comprising a configuration block and a sequence of frames respectively representing consecutive time periods of an audio content, wherein the sequence of frames is a composition of N sequences of frame elements with each frame element being of a respective one of a plurality of element types so that each frame comprises one frame element out of the N sequences of frame elements, respectively, and for each sequence of frame elements, the frame elements are of equal element type relative to each other,

wherein the decoder is configured to parse the bitstream and reconstruct the audio content based on a subset of the sequences of frame elements and to, with respect to at least one of the sequences of frame elements, not belonging to the subset of the sequences of frame elements,

read from the configuration block, for the at least one of the sequences of frame elements, a default payload length information on a default payload length, and

for each frame element of the at least one of the sequences of frame elements, read a length information from the bitstream, the reading of the length information comprising, for at least a subset of the frame elements of the at least one of the sequences of frame elements, reading a default payload length flag followed, if the default payload length flag is not set, by reading a payload length value,

skip, in parsing the bitstream, any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is set, using the default payload length as skip interval length, and any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is not set, using a payload length corresponding to the payload length value as skip interval length.

In another aspect, there is provided an encoder for encoding of an audio content into a bitstream, the decoder being configured to encode consecutive time periods of the audio content into a sequence of frames respectively representing the consecutive time periods of the audio content, such that the sequence of frames is a composition of N sequences of frame elements with each frame element being of a respective one of a plurality of element types so that each frame comprises one frame element out of the N sequences of frame

elements, respectively, and for each sequence of frame elements, the frame elements are of equal element type relative to each other,

encode into the bitstream a configuration block which comprises, for at least one of the sequences of frame elements, a default payload length information on a default payload length, and

encoding each frame element of the at least one of the sequences of frame elements into the bitstream such that same comprises a length information comprising, for at least a subset of the frame elements of the at least one of the sequences of frame elements, a default payload length flag followed, if the default payload length flag is not set, by a payload length value, and that any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is set, has the default payload length, and any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is not set, has a payload length corresponding to the payload length value.

In another aspect, there is provided a method for decoding a bitstream comprising a configuration block and a sequence of frames respectively representing consecutive time periods of an audio content, wherein the sequence of frames is a composition of N sequences of frame elements with each frame element being of a respective one of a plurality of element types so that each frame comprises one frame element out of the N sequences of frame elements, respectively, and for each sequence of frame elements, the frame elements are of equal element type relative to each other, wherein the method comprises parsing the bitstream and reconstructing the audio content based on a subset of the sequences of frame elements and, with respect to at least one frame of the sequences of frame elements, not belonging to the subset of the sequences of frame elements,

reading from the configuration block, for the at least one of the sequences of frame elements, a default payload length information on a default payload length, and

for each frame element of the at least one of the sequences of frame elements, reading a length information from the bitstream, the reading of the length information comprising, for at least a subset of the frame elements of the at least one of the sequences of frame elements, reading a default payload length flag followed, if the default payload length flag is not set, by reading a payload length value,

skipping, in parsing the bitstream, any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is set, using the default payload length as skip interval length, and any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is not set, using a payload length corresponding to the payload length value as skip interval length.

In another aspect, there is provided a method for encoding of an audio content into a bitstream, the method comprising encoding consecutive time periods of the audio content into a sequence of frames respectively representing the consecutive time periods of the audio content, such that the sequence of frames is a composition of N sequences of frame elements with each frame element being of a respective one of a plurality of element types so that each frame comprises one frame element out of the N sequences of frame elements, respectively, and for each sequence of frame elements, the frame elements are of equal element type relative to each other,

encoding into the bitstream a configuration block which comprises, for at least one of the sequences of frame elements, a default payload length information on a default payload length, and

encoding each frame element of the at least one of the sequences of frame elements into the bitstream such that same comprises a length information comprising, for at least a subset of the frame elements of the at least one of the sequences of frame elements, a default payload length flag followed, if the default payload length flag is not set, by a payload length value, and that any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is set, has the default payload length, and any frame element of the at least one of the sequences of frame elements, the default extension payload length flag of which is not set, has a payload length corresponding to the payload length value .

Advantageous implementations of embodiments of the present ~~invention~~ application are the subject of the dependent claims.

Further, preferred embodiments of the present application are described below with respect to the figures, among which:

Fig. 1 shows a schematic block diagram of an encoder and its input and output in accordance with an embodiment;

Fig. 2 shows a schematic block diagram of a decoder and its input and output in accordance with an embodiment;

Fig. 3 schematically shows a bitstream in accordance with an embodiment;

Fig. 4 a to z and za to zc show tables of pseudo code, illustrating a concrete syntax of bitstream in accordance with an embodiment; and

Fig. 5 a and b show a block diagram of a USAC encoder and decoder; and

Fig. 6 shows a typical pair of encoder and decoder

3. Bitstream according to claim 2, wherein the type indication syntax portion comprises a sequence of N syntax elements with each syntax element indicating the element type for the respective element position at which the respective syntax element is positioned within the type indication syntax portion.

4. Bitstream according to any of claims 1 to 3, wherein the configuration block comprises one configuration element per sequence of frame elements, comprising configuration information for the element type of which the frame elements of the respective sequence of frame elements are.

5. Bitstream according to claim 4, wherein the type indication syntax portion comprises a sequence of N syntax elements with each syntax element indicating the element type for the respective element position at which the respective syntax element is positioned within the type indication syntax portion, and the configuration elements and the syntax elements are arranged in the bitstream alternately.

6. Bitstream according to claim 5 ~~or 6~~, wherein for each frame element of the at least one sequence of frame elements, the length information comprises an extension payload present flag, wherein any frame element, the extension payload present flag of the length information of which is not set, merely consists of the extension payload present flag, and the length information of any frame element, the payload data present flag of the length information of which is set, further comprises the default payload length flag followed, if the default payload length flag is not set, by the payload length value.

7. Bitstream according to any of claims 1 to 6, wherein the configuration block comprises, for the at least one of the sequences of frame elements, a configuration element comprising configuration information, wherein the configuration information comprises an extension element type field indicating a payload data type out of a plurality of payload data types, wherein the plurality of payload data types comprises a multi-channel side information type and a multi-object coding side information type, wherein the configuration information, the extension element type field of which indicates the multi-channel side information, also comprises multi-channel side information configuration data, and the configuration information the extension element type field of which indicates the multi-object side information type, also comprise multi-object side information configuration