

Claims

- 5 | 1. Spliceable audio data stream ~~(40)~~, comprising:
- 10 | a sequence of payload packets ~~(16)~~, each of the payload packets belonging to a respective one of a sequence of access units ~~(18)~~ into which the spliceable audio data stream is partitioned, each access unit being associated with a respective one of audio frames ~~(14)~~ of an audio signal ~~(12)~~ which is encoded into the spliceable audio data stream in units of the audio frames; and
- 15 | a truncation unit packet ~~(42; 58)~~ inserted into the spliceable audio data stream and being settable so as to indicate, for a predetermined access unit, an end portion ~~(44; 56)~~ of an audio frame with which the predetermined access unit is associated, as to be discarded in playout.
- 20 | 2. Spliceable audio data stream according to claim 1, wherein the spliceable audio data stream further comprises:
- 25 | a further truncation unit packet ~~(58)~~ inserted into the spliceable audio data stream and being settable so as to indicate for a further predetermined access unit, an end portion ~~(44; 56)~~ of a further audio frame with which the further predetermined access unit is associated, as to be discarded in playout.
- 30 | 3. Spliceable audio data stream according to claim 2, wherein the predetermined access unit has encoded therein the respective associated audio frame in a manner so that a reconstruction thereof at decoding side is dependent on an access unit immediately preceding the predetermined access unit, and a majority of the access units has encoded therein the respective associated audio frame in a manner so that the reconstruction thereof at decoding side is dependent on the respective immediately preceding access unit, and the further predetermined access unit has encoded therein the respective associated audio frame in a manner so that the reconstruction thereof at decoding side is independent from the access unit immediately preceding the further predetermined access unit, thereby
- 35 | allowing immediate playout.

4. Spliceable audio data stream according to claim 3, wherein the truncation unit packet ~~(42)~~ and the further truncation unit packet ~~(58)~~ comprise a splice-out syntax element ~~(50)~~, respectively, which indicates whether the respective one of the truncation unit packet or the further truncation unit packet relates to a splice-out access unit or not, wherein the splice-out syntax element ~~(50)~~ comprised by the truncation unit packet indicates that the truncation unit packet relates to a splice-out access unit and the syntax element comprised by the further truncation unit packet indicates that the further truncation unit packet relates not to a splice-out access unit.
5. Spliceable audio data stream according to claim 3, wherein the truncation unit packet ~~(42)~~ and the further truncation unit packet ~~(58)~~ comprise a splice-out syntax element, respectively, which indicates whether the respective one of the truncation unit packet or the further truncation unit packet relates to a splice-out access unit or not, wherein the syntax element ~~(50)~~ comprised by the truncation unit packet indicates that the truncation unit packet relates to a splice-out access unit and the splice-out syntax element comprised by the further truncation unit packet indicates that the further truncation unit packet relates to a splice-out access unit, too, wherein the further truncation unit packet comprises a leading/trailing-end truncation syntax element ~~(54)~~ and a truncation length element ~~(48)~~, wherein the leading/trailing-end truncation syntax element is for indicating whether the end portion of the further audio frame is a trailing end portion ~~(44)~~ or a leading end portion ~~(56)~~ and the truncation length element is for indicating a length ~~(44)~~ of the end portion of the further audio frame.
6. Spliced audio data stream, comprising:
- a sequence of payload packets ~~(16)~~, each of the payload packets belonging to a respective one of a sequence of access units ~~(18)~~ into which the spliced audio data stream is partitioned, each access unit being associated with a respective one of audio frames ~~(14)~~;
- a truncation unit packet ~~(42; 58; 114)~~ inserted into the spliced audio data stream and indicating an end portion ~~(44; 56)~~ of an audio frame with which a predetermined access unit is associated, as to be discarded in playout,

wherein in a first subsequence of payload packets of the sequence of payload packets, each payload packet belongs to an access unit ~~(AU_#)~~ of a first audio data stream having encoded therein a first audio signal in units of audio frames of the first audio signal, and the access units of the first audio data stream including the predetermined access unit, and in a second subsequence of payload packets of the sequence of payload packets, each payload packet belongs to access units ~~(AU'_#)~~ of a second audio data stream having encoded therein a second audio signal in units of audio frames of the second audio data stream,

wherein the first and the second subsequences of payload packets are immediately consecutive with respect to each other and abut each other at the predetermined access unit and the end portion is a trailing end portion ~~(44)~~ in case of the first subsequence preceding the second subsequence and a leading end portion ~~(56)~~ in case of the second subsequence preceding the first subsequence.

7. Spliced audio data stream according to claim 6, wherein the spliced audio data stream further comprises a further truncation unit packet ~~(58)~~ inserted into the spliced audio data stream and indicating a leading end portion ~~(58)~~ of a further audio frame with which a further predetermined access unit is associated, as to be discarded in playout, wherein in a third subsequence of payload packets of the sequence of payload packets, each payload packet belongs to access units ~~(AU'_#)~~ of a third audio data stream having encoded therein a third audio signal, or to access units ~~(AU_#)~~ of the first audio data stream, following the access units of the first audio data stream to which the payload packets of the first subsequence belong, wherein the access units of the ~~second~~ third audio data stream include the further predetermined access unit.

8. Spliced audio data stream according to claim 7, wherein a majority of the access units of the spliced audio data stream including the predetermined access unit has encoded therein the respective associated audio frame in a manner so that a reconstruction thereof at decoding side is dependent on a respective immediately preceding access unit, wherein the access unit immediately succeeding the predetermined access unit and forming an onset of the access units of the second audio data stream has encoded therein the respective associated audio frame in a manner so that the reconstruction thereof is independent from the predetermined access unit, thereby allowing immediate playout, and the further predetermined

access unit has encoded therein the further audio frame in a manner so that the reconstruction thereof is independent from the access unit immediately preceding further predetermined access unit, thereby allowing immediate playout, respectively.

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9. Spliced audio data stream according to claim 7 or 8, wherein the spliced audio data stream further comprises an even further truncation unit packet ~~(114)~~ inserted into the spliced audio data stream and indicating a trailing end portion ~~(44)~~ of an even further audio frame with which the access unit immediately preceding the further predetermined access unit is associated, as to be discarded in playout, wherein the spliced audio data stream comprises timestamp information ~~(24)~~ indicating for each access unit of the spliced audio data stream a respective timestamp at which the audio frame with which the respective access unit is associated, is to be played out, wherein a timestamp of the further predetermined access unit equals the timestamp of the access unit immediately preceding the further predetermined access unit plus a temporal length of the audio frame with which the access unit immediately preceding the further predetermined access unit is associated, minus the sum of a temporal length of the leading end portion of the further audio frame and the trailing end portion of the even further audio frame.

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10. Spliced audio data stream according to claim 8 or 9, wherein a temporal timestamp of the access unit immediately succeeding the predetermined access unit is equal to the timestamp of the predetermined access unit plus a temporal length of the audio frame with which the predetermined access unit is associated, minus a temporal length of the trailing end portion of the audio frame with which the predetermined access unit is associated.

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11. Stream splicer for splicing audio data streams, comprising:

30 a first audio input interface ~~(102)~~ for receiving a first audio data stream ~~(40)~~ comprising a sequence of payload packets ~~(16)~~, each of which belongs to a respective one of a sequence of access units ~~(18)~~ into which the first audio data stream is partitioned, each access unit of the first audio data stream being associated with a respective one of audio frames ~~(14)~~ of a first audio signal ~~(12)~~

35 which is encoded into the first audio data stream in units of audio frames of the first audio signal;

a second audio input interface ~~(104)~~ for receiving a second audio data stream ~~(110)~~ comprising a sequence of payload packets, each of which belongs to a respective one of a sequence of access units into which the second audio data stream is partitioned, each access unit of the second audio data stream being associated with a respective one of audio frames of a second audio signal which is encoded into the second audio data stream in units of audio frames of the second audio signal;

a splice point setter; and

a splice multiplexer,

wherein the first audio data stream further comprises a truncation unit packet ~~(42; 58)~~ inserted into the first audio data stream and being settable so as to indicate for a predetermined access unit, an end portion ~~(44; 56)~~ of an audio frame with which a predetermined access unit is associated, as to be discarded in playout, and the splice point setter ~~(106)~~ is configured to set the truncation unit packet ~~(42; 58)~~ so that the truncation unit packet indicates an end portion ~~(44; 56)~~ of the audio frame with which the predetermined access unit is associated, as to be discarded in playout, or the splice point setter ~~(106)~~ is configured to insert a truncation unit packet ~~(42; 58)~~ into the first audio data stream and sets same so as to indicate for a predetermined access unit, an end portion ~~(44; 56)~~ of an audio frame with which ~~a~~ the predetermined access unit is associated, as to be discarded in playout ~~set the truncation unit packet (42; 58) so that the truncation unit packet indicates an end portion (44; 56) of the audio frame with which the predetermined access unit is associated, as to be discarded in playout;~~ and

wherein the splice multiplexer ~~(108)~~ is configured to cut the first audio data stream ~~(40)~~ at the predetermined access unit so as to obtain a subsequence of payload packets of the first audio data stream within which each payload packet belongs to a respective access unit of a run of access units of the first audio data stream including the predetermined access unit, and splice the subsequence of payload packets of the first audio data stream and the sequence of payload packets of the second audio data stream so that same are immediately consecutive with respect to each other and abut each other at the predetermined access unit, wherein the

end portion of the audio frame with which the predetermined access unit is associated is a trailing end portion-~~(44)~~ in case of the subsequence of payload packets of the first audio data stream preceding the sequence of payload packets of the second audio data stream and a leading end portion-~~(56)~~ in case of the subsequence of payload packets of the first audio data stream succeeding the sequence of payload packets of the second audio data stream.

12. Stream splicer according to claim 11, wherein the subsequence of payload packets of the first audio data stream precedes ~~the second subsequence~~ the sequence of payload packets of the second audio data stream and the end portion of the audio frame with which the predetermined access unit is associated is a trailing end portion-~~(44)~~.

13. Stream splicer according to claim 11 or 12, wherein the splice point setter is configured to set a temporal length of the end portion so as to coincide with an external clock, wherein the external clock is a video frame clock.

14. Stream splicer ~~Spliced audio data stream~~ according to claim 12, wherein the second audio data stream has, or the splice point setter-~~(106)~~ causes by insertion, a further truncation unit packet-~~(114)~~ inserted into the second audio data stream ~~(110)~~ and settable so as to indicate an end portion of a further audio frame with which a terminating access unit of the second audio data stream-~~(110)~~ is associated, as to be discarded in playout, and the first audio data stream further comprises an even further truncation unit packet-~~(58)~~ inserted into the first audio data stream-~~(40)~~ and settable so as to indicate an end portion of an even further audio frame with which the even further predetermined access unit is associated, as to be discarded in playout, wherein a temporal distance between the audio frame of the predetermined access unit and the even further audio frame of the even further predetermined access unit coincides with a temporal length of the second audio signal between a leading access unit thereof succeeding, after splicing, the predetermined access unit and the terminating ~~trailing~~-access unit, wherein the splice-point setter-~~(106)~~ is configured to set the further truncation unit packet-~~(114)~~ so that same indicates a trailing end portion-~~(44)~~ of the further audio frame as to be discarded in playout, and the even further truncation unit packet ~~(58)~~ so that same indicates a leading end portion of the even further audio frame as to be discarded in playout, wherein the splice multiplexer-~~(108)~~ is configured to

adapt timestamp information ~~(24)~~ comprised by the second audio data stream ~~(110)~~ and indicating for each access unit a respective timestamp at which the audio frame with which the respective access unit is associated, is to be played out, so that a time stamp of a leading audio frame which the leading access unit of the second audio data stream ~~(110)~~ is associated coincides with the timestamp of the audio frame with which the predetermined access unit is associated plus the temporal length of the audio frame with which the predetermined access unit is associated minus the temporal length of the trailing end portion of the audio frame with which the predetermined access unit is associated and the splice-point setter ~~(106)~~ is configured to set the further truncation unit packet ~~(114)~~ and the even further truncation unit packet ~~(58)~~ so that a timestamp of the even further audio frame equals the timestamp of the further audio frame plus a temporal length of the further audio frame minus the sum of a temporal length of the trailing end portion of the further audio frame and the leading end portion of the even further audio frame.

15. Stream splicer ~~Spliced audio data stream~~ according to claim 12, wherein the second audio data stream ~~(110)~~ has, or the splice point setter ~~(106)~~ causes by insertion, a further truncation unit packet ~~(112)~~ inserted into the second audio data stream and which is settable so as to indicate an end portion of a further audio frame with which a leading access unit of the second audio data stream is associated, as to be discarded in playout, wherein the splice-point setter ~~(106)~~ is configured to set the further truncation unit packet ~~(112)~~ so that same indicates a leading end portion of the further audio frame as to be discarded in playout, wherein timestamp information ~~(24)~~ comprised by the first and second audio data streams and indicating for each access unit a respective timestamp at which the audio frame with which the respective access unit of the first and second audio data streams is associated, is to be played out, are temporally aligned and the splice-point setter ~~(106)~~ is configured to set the further truncation unit packet so that a timestamp of the further audio frame minus a temporal length of the audio frame with which the predetermined access unit is associated plus a temporal length of the leading end portion equals the timestamp of the audio frame with which the predetermined access unit is associated plus a temporal length of the audio frame with which the predetermined access unit is associated minus the temporal length of the trailing end portion.

16. Audio decoder comprising:

5 an audio decoding core ~~(162)~~ configured to reconstruct an audio signal ~~(12)~~, in units of audio frames ~~(14)~~ of the audio signal, from a sequence of payload packets ~~(16)~~ of an audio data stream ~~(120)~~, wherein each of the payload packets belongs to a respective one of a sequence of access units ~~(18)~~ into which the audio data stream is partitioned, wherein each access unit is associated with a respective one of the audio frames; and

10 an audio truncator ~~(164)~~ configured to be responsive to a truncation unit packet ~~(42; 58; 114)~~ inserted into the audio data stream so as to truncate an audio frame associated with a predetermined access unit so as to discard, in playing out the audio signal, an end portion thereof indicated to be discarded in payout by the truncation unit packet.

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17. Audio decoder according to claim 16, wherein the truncation unit packet comprises

a leading/trailing-end truncation syntax element and

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a truncation length element,

wherein the decoder uses the leading/trailing-end truncation syntax element as indication whether the end portion is a trailing end portion or a leading end portion and the truncation length element as an indication of a length of the end portion of the audio frame.

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~~+7~~18. Audio encoder comprising:

30 an audio encoding core ~~(72)~~ configured to encode an audio signal ~~(12)~~, in units of audio frames ~~(14)~~ of the audio signal, into payload packets ~~(16)~~ of an audio data stream ~~(40)~~ so that each payload packet belongs to a respective one of access units ~~(18)~~ into which the audio data stream is partitioned, each access unit being associated with a respective one of the audio frames, and

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a truncation packet inserter ~~(74)~~ configured to insert into the audio data stream a truncation unit packet ~~(44; 58)~~ being settable so as to indicate an end portion of an

audio frame with which a predetermined access unit is associated, as being to be discarded in playout.

- 5 19. Audio encoder according to claim 18, configured to perform a rate control so that a
bitrate of the audio data stream varies around, and obeys, a predetermined mean
bitrate so that an integrated bitrate deviation from the predetermined mean bitrate
assumes, at the predetermined access unit, a value within a predetermined
interval which is less than $\frac{1}{2}$ wide than a range of the integrated bitrate deviation
as varying over the complete spliceable audio data stream.
- 10 20. Audio encoder according to claim 18 or 19, configured to perform a rate control so
that a bitrate of the audio data stream varies around, and obeys, a predetermined
mean bitrate so that an integrated bitrate deviation from the predetermined mean
bitrate assumes, at the predetermined access unit, a fixed value smaller than $\frac{3}{4}$ of
a maximum of the integrated bitrate deviation as varying over the complete
spliceable audio data stream.
- 15 21. Audio encoder according to any of claims 18 to 20, configured to perform a rate
control so that a bitrate of the audio data stream varies around, and obeys, a
predetermined mean bitrate so that an integrated bitrate deviation from the
predetermined mean bitrate assumes, at the predetermined access unit as well as
other access units for which truncation unit packets are inserted into the audio data
stream, a predetermined value.
- 20 22. Audio encoder according to any of claims 18 to 21, configured to perform a rate
control by logging a coded audio decoder buffer fill state so that a logged fill state
assumes, at the predetermined access unit, a predetermined value.
- 25 23. Audio encoder according to claim 22, wherein the predetermined value is common
among access units for which truncation unit packets are inserted into the audio
data stream.
- 30 24. Audio encoder according to claim 23, configured to signal the predetermined value
within the audio data stream.
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~~18~~²⁵. Method for splicing audio data streams comprising a first audio data stream ~~(40)~~ comprising a sequence of payload packets ~~(16)~~, each of which belongs to a respective one of a sequence of access units ~~(18)~~ into which the first audio data stream is partitioned, each access unit of the first audio data stream being associated with a respective one of audio frames ~~(14)~~ of a first audio signal ~~(12)~~ which is encoded into the first audio data stream in units of audio frames of the first audio signal; and a second audio data stream ~~(110)~~ comprising a sequence of payload packets, each of which belongs to a respective one of a sequence of access units into which the second audio data stream is partitioned, each access unit of the second audio data stream being associated with a respective one of audio frames of a second audio signal which is encoded into the second audio data stream in units of audio frames of the second audio signal;

wherein

the first audio data stream further comprises a truncation unit packet ~~(42; 58)~~ inserted into the first audio data stream and being settable so as to indicate for a predetermined access unit, an end portion ~~(44; 56)~~ of an audio frame with which a predetermined access unit is associated, as to be discarded in playout, and the method comprises setting the truncation unit packet ~~(42; 58)~~ so that the truncation unit packet indicates an end portion ~~(44; 56)~~ of the audio frame with which the predetermined access unit is associated, as to be discarded in playout, or the method comprises inserting a truncation unit packet ~~(42; 58)~~ into the first audio data stream and sets same so as to indicate for a predetermined access unit, an end portion ~~(44; 56)~~ of an audio frame with which a predetermined access unit is associated, as to be discarded in playout and setting the truncation unit packet ~~(42; 58)~~ so that the truncation unit packet indicates an end portion ~~(44; 56)~~ of the audio frame with which the predetermined access unit is associated, as to be discarded in playout; and

the method further comprises cutting the first audio data stream ~~(40)~~ at the predetermined access unit so as to obtain a subsequence of payload packets of the first audio data stream within which each payload packet belongs to a respective access unit of a run of access units of the first audio data stream including the predetermined access unit, and splicing the subsequence of payload packets of the first audio data stream and the sequence of payload packets of the

second audio data stream so that same are immediately consecutive with respect to each other and abut each other at the predetermined access unit, wherein the end portion of the audio frame with which the predetermined access unit is associated is a trailing end portion ~~(44)~~ in case of the subsequence of payload packets of the first audio data stream preceding the sequence of payload packets of the second audio data stream and a leading end portion ~~(56)~~ in case of the subsequence of payload packets of the first audio data stream succeeding the sequence of payload packets of the second audio data stream.

10 | ~~19~~26. Audio decoding method comprising:

reconstructing an audio signal ~~(12)~~, in units of audio frames ~~(14)~~ of the audio signal, from a sequence of payload packets ~~(16)~~ of an audio data stream ~~(120)~~, wherein each of the payload packets belongs to a respective one of a sequence of access units ~~(18)~~ into which the audio data stream is partitioned, wherein each access unit is associated with a respective one of the audio frames; and

responsive to a truncation unit packet ~~(42; 58; 114)~~ inserted into the audio data stream, truncating an audio frame associated with a predetermined access unit so as to discard, in playing out the audio signal, an end portion thereof indicated to be discarded in playout by the truncation unit packet.

20 | ~~20~~27. Audio encoding method comprising:

25 | encoding an audio signal ~~(12)~~, in units of audio frames ~~(14)~~ of the audio signal, into payload packets ~~(16)~~ of an audio data stream ~~(40)~~ so that each payload packet belongs to a respective one of access units ~~(18)~~ into which the audio data stream is partitioned, each access unit being associated with a respective one of the audio frames, and

30 | inserting into the audio data stream a truncation unit packet ~~(44; 58)~~ being settable so as to indicate an end portion of an audio frame with which a predetermined access unit is associated, as being to be discarded in playout.

~~24~~28. Computer readable digital storage medium having stored thereon a computer program having a program code for performing, when running on a computer, a method according to any of claims ~~18~~25 to ~~20~~27.