Amended Set of Claims 1 to 79

1. A method of encoding video data, the method comprising:

determining, for a current picture of the video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data;

determining a number of bits to be used to represent one or more least significant bits of a picture order count value that identifies the long-term reference picture ;

specifying, in a sequence parameter set of a bitstream representative of an encoded version of the video data, the one or more least significant bits of the picture order count value using the determined number of bits;

determining whether to specify one or more most significant bits of the picture order count value in the bitstream;

based on the determination of whether to specify the one or more most significant bits, specifying the most significant bits of the picture order count value in a slice header of the bitstream; and

encoding at least the portion of the current picture using the long-term reference picture.

2. The method of claim 1, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in the sequence parameter set.

3. The method of claim 1, wherein specifying the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream comprises specifying an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

4. The method of claim 1, further comprising specifying the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream.

5. The method of claim 1, wherein determining the number of bits comprises determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

6. (Cancelled)

7. The method of claim 1, wherein determining whether to specify the one or more most significant bits of the picture order count value comprises, when one or more least significant bits of any other picture order count values that identify any other picture stored to a decoded picture buffer to which the long-term reference picture is also stored are the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture, determining the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture, wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value.

8. (Cancelled)

9. The method of claim 1, further comprising:

determining the one or more least significant bits for at least one picture order count value that identifies a respective one of the other pictures stored to the decoded picture buffer; and

determining whether the one or more least significant bits for the at least one picture order count value that identifies the respective one of the other pictures stored to the decoded picture buffer is the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture.

10. The method of claim 1, wherein determining the one or more most significant bits of the picture order count value comprises determining the one or more most significant bits of the picture order count value such that the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to uniquely identify the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer.

11. The method of claim 1, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

12. A video encoding device configured to encode video data, the video encoding device comprising:

one or more processors configured to determine, for a current picture of the video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data, determine a number of bits to be used to represent one or more least significant bits of a picture order count value that identifies the long-term reference picture in a bitstream representative of an encoded version of the video data, specify, in a sequence parameter set of the bitstream, the one or more least significant bits of the picture order count value using the determined number of bits , determine whether to specify one or more most significant bits of the picture order count value in the bitstream, based on the determination of whether to specify the one or more most significant bits, specifying the most significant bits of the picture order count value in a slice header of the bitstream, and encode at least the portion of the current picture using the long-term reference picture.

13. The video encoding device of claim 12, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in a decoded picture buffer but

that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

14. The video encoding device of claim 12, wherein the one or more processors are further configured to, when specifying the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream, specify an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

15. The video encoding device of claim 12, wherein the one or more processors are further configured to specify the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream.

16. The video encoding device of claim 12, wherein the one or more processors are further configured to, when determining the number of bits, determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

17. (Cancelled)

18. The video encoding device of claim 12, wherein the one or more processors are further configured to, when one or more least significant bits of any other picture order count values that identify any other picture stored to a decoded picture buffer to which the long-term reference picture is also stored are the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture, determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture, wherein a number of the one or more least

significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value .

19. (Cancelled)

20. The video encoding device of claim 12, wherein the one or more processors are further configured to determine the one or more least significant bits for at least one picture order count value that identifies a respective one of the other pictures stored to the decoded picture buffer, and determine whether the one or more least significant bits for the at least one picture order count value that identifies the respective one of the other pictures stored to the decoded picture buffer is the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture.

21. The video encoding device of claim 12, wherein the one or more processors are further configured to, when determining the one or more most significant bits of the picture order count value, determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture such that the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to uniquely identify the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer.

22. The video encoding device of claim 12, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

23. A video encoding device for encoding video data, the video encoding device comprising:

means for determining, for a current picture of the video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data;

means for determining a number of bits to be used to represent one or more least significant bits of a picture order count value that identifies the long-term reference picture in a bitstream representative of an encoded version of the video data,

means for specifying, in a sequence parameter set of the bitstream, the one or more least significant bits of the picture order count value using the determined number of bits,

means for determining whether to specify one or more most significant bits of the picture order count value in the bitstream;

means for, based on the determination of whether to specify the one or more most significant bits, specifying the most significant bits of the picture order count value in a slice header of the bitstream; and

means for encoding at least the portion of the current picture using the long-term reference picture.

24. The video encoding device of claim 23, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

25. The video encoding device of claim 23, wherein the means for specifying the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream comprises means for specifying an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

26. The video encoding device of claim 23, further comprising means for specifying the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream.

27. The video encoding device of claim 23, wherein means for determining the number of bits comprises means for determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

28. (Cancelled)

29. A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause one or more processors of a video encoding device to:

determine, for a current picture of video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data;

determine a number of bits to be used to represent one or more least significant bits of a picture order count value that identifies the long-term reference picture in a bitstream representative of an encoded version of the video data;

specify, in a sequence parameter set of the bitstream, the one or more least significant bits of the picture order count value using the determined number of bits ;

determine whether to specify one or more most significant bits of the picture order count value in the bitstream;

based on the determination of whether to specify the one or more most significant bits, specify the most significant bits of the picture order count value in a slice header of the bitstream; and

encode at least the portion of the current picture using the long-term reference picture.

30. The non-transitory computer-readable storage medium of claim 29, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

31. The non-transitory computer-readable storage medium of claim 29, wherein the instructions that, when executed, cause the one or more processors to specify the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream comprise instructions that, when executed, cause the one or more processors to specify an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

32. The non-transitory computer-readable storage medium of claim 29, further having stored thereon instructions that, when executed, cause the one or more processors to specify the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream.

33. The non-transitory computer-readable storage medium of claim 29, wherein the instructions that, when executed, cause the one or more processors to determine the number of bits comprise instructions that, when executed, cause the one or more processors to determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

34. (Cancelled)

35. The non-transitory computer-readable storage medium of claim 29, further having stored thereon instructions that, when executed, cause the one or more processors to:

when one or more least significant bits of any other picture order count values that identify any other picture stored to a decoded picture buffer to which the long-term reference picture is also stored are the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture, determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture, wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value.

36. The non-transitory computer-readable storage medium of claim 29, wherein the determined one or more least significant bits of the picture order count that identifies the long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated with the current picture and a sequence parameter set associated with the picture.

37. The non-transitory computer-readable storage medium of claim 29, further having stored thereon instructions that, when executed, cause the one or more processors to:

determine the one or more least significant bits for at least one picture order count value that identifies a respective one of the other pictures stored to the decoded picture buffer; and

determine whether the one or more least significant bits for the at least one picture order count value that identifies the respective one of the other pictures stored to the decoded picture buffer is the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture.

38. The non-transitory computer-readable storage medium of claim 29, wherein the instructions that, when executed, cause the one or more processors to determine the one or more most significant bits of the picture order count value comprise instructions that, when executed, cause the one or more processors to determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture such that the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to uniquely identify the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer.

39. The non-transitory computer-readable storage medium of claim 35, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

40. A method of decoding encoded video data, the method comprising:

determining, for a current picture of the encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that identifies a long-term reference picture to be used when decoding at least a portion of the current picture;

parsing the determined number of bits from a sequence parameter set of a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that identifies the long-term reference picture;

determining whether one or more most significant bits of the picture order count value are specified in a slice header of the bitstream;

based on the determination of whether the one or more most significant bits are specified, parsing the one or more most significant bits of the picture order count value from the slice header of the bitstream; and

retrieving the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the most significant bits of the picture order count value; and

decoding at least the portion of the current picture using the retrieved long-term reference picture.

41. The method of claim 40, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in the sequence parameter set .

42. The method of claim 40, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that identifies the long-term reference picture as an unsigned binary number.

43. The method of claim 40, wherein retrieving the long-term reference picture from the decoded picture buffer comprises retrieving the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

44. The method of claim 43, wherein retrieving the long-term reference picture from the decoded picture buffer comprises:

comparing the least significant bits of the picture order count value that identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer; and

retrieving the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

45. The method of claim 40, wherein determining the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures comprises parsing the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

46. The method of claim 40, wherein determining the number of bits comprises determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

47. The method of claim 40, wherein determining whether the one or more most significant bits of the picture order count value are specified comprises, when the one or more least significant bits do not uniquely identify the picture order count value of the long-term reference picture with respect to the one or more least significant bits of any other picture order count value that identifies any other picture present in a decoded picture buffer to which the long-term reference picture is also stored, determining that the one or more most significant bits of the picture order count value are specified in the slice header,

wherein the one or more most significant bits in combination with the determined one or more least significant bits are sufficient to distinguish the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer,

wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and

wherein retrieving the long-term reference picture from the decoded picture buffer comprises retrieving the long-term reference picture form the decoded picture buffer based on the determined one or more least significant bits of the picture order count value and the determined one or more most significant bits of the picture order count value.

48. (Cancelled)

49. The method of claim 40, wherein determining the one or more most significant bits of the picture order count value comprises parsing, from a bitstream representative of the encoded video data, the one or more most significant bits of the picture order count value that identifies the long-term reference picture.

50. The method of claim 40, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

51. A video decoding device for decoding encoded video data, the video decoding device comprising:

one or more processors configured to determine, for a current picture of the encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that identifies a long-term reference picture to be used when decoding at least a portion of the current picture, parse the determined number of bits from a sequence parameter set of a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that identifies the long-term reference picture, determine whether one or more most significant bits of the picture order count value are specified in a slice header of the bitstream, based on the determination of whether the one or more most significant bits are specified, parsing the one or more most significant bits of the picture order count value from the slice header of the bitstream, retrieve the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the most significant bits of the picture

order count value, and decode at least the portion of the current picture using the retrieved long-term reference picture.

52. The video decoding device of claim 51, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in the sequence parameter set .

53. The video decoding device of claim 51, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that identifies the long-term reference picture as an unsigned binary number.

54. The video decoding device of claim 51, wherein the one or more processors are further configured to, when retrieving the long-term reference picture from the decoded picture buffer, retrieve the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

55. The video decoding device of claim 54, wherein the one or more processors are further configured to, when retrieving the long-term reference picture from the decoded picture buffer, compare the least significant bits of the picture order count value that identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer and retrieve the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

56. The video decoding device of claim 51, wherein the one or more processors are further configured to, when determining the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures, parse the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

57. The video decoding device of claim 51, wherein the one or more processors are further configured to, when determining the number of bits, determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

58. The video decoding device of claim 51,

wherein, when determining whether the one or more most significant bits of the picture order count value are specified, the one or more processors are further configured to, when the one or more least significant bits do not uniquely identify the picture order count value of the long-term reference picture with respect to the one or more least significant bits of any other picture order count value that identifies any other picture present in a decoded picture buffer to which the long-term reference picture is also stored, determine that the one or more most significant bits of the picture order count value are specified in a slice header of the bitstream,

wherein the one or more most significant bits in combination with the determined one or more least significant bits are sufficient to distinguish the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer,

wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and

wherein the one or more processors are further configured to, when retrieving the long-term reference picture from the decoded picture buffer, retrieve the long-term reference picture form the decoded picture buffer based on the determined one or more least significant bits of the picture order count value and the determined one or more most significant bits of the picture order count value.

59. (Cancelled)

60. The video decoding device of claim 51, wherein the one or more processors are further configured to, when determining the one or more most significant bits of the picture order count value that identifies the long-term reference picture, parse, from a bitstream representative of the encoded video data, the one or more most significant bits of the picture order count value that identifies the long-term reference picture.

61. The video decoding device of claim 51, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

62. A video decoding device for decoding encoded video data, the video decoding device comprising:

means for determining, for a current picture of the encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that identifies a long-term reference picture to be used when decoding at least a portion of the current picture;

means for parsing the determined number of bits from a sequence parameter set of a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that identifies the long-term reference picture;

means for determining whether one or more most significant bits of the picture order count value are specified in a slice header of the bitstream;

means for, based on the determination of whether the one or more most significant bits are specified, parsing the one or more most significant bits of the picture order count value from the slice header of the bitstream;

means for retrieving the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the most significant bits of the picture order count value; and

means for decoding at least the portion of the current picture using the retrieved long-term reference picture.

63. The video decoding device of claim 62, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in the sequence parameter set .

64. The video decoding device of claim 62, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that identifies the long-term reference picture as an unsigned binary number.

65. The video decoding device of claim 62, wherein the means for retrieving the long-term reference picture from the decoded picture buffer comprises means for retrieving the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

66. The video decoding device of claim 65, wherein the means for retrieving the long-term reference picture from the decoded picture buffer comprises:

means for comparing the least significant bits of the picture order count value that identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer; and

means for retrieving the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

67. The video decoding device of claim 62, wherein the means for determining the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures comprises means for parsing the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

68. The video decoding device of claim 62, wherein the means for determining the number of bits comprises means for determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

69. A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause one or more processor of a video decoding device to:

determine, for a current picture of encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that identifies a long-term reference picture to be used when decoding at least a portion of the current picture;

parse the determined number of bits from a sequence parameter set of a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value;

determine whether one or more most significant bits of the picture order count value are specified in a slice header of the bitstream;

based on the determination of whether the one or more most significant bits are specified, parse the one or more most significant bits of the picture order count value from the slice header of the bitstream;

retrieve the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the most significant bits of the picture order count value; and

decode at least the portion of the current picture using the retrieved long-term reference picture.

70. The non-transitory computer-readable storage medium of claim 69, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in the sequence parameter set .

71. The non-transitory computer-readable storage medium of claim 69, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that identifies the long-term reference picture as an unsigned binary number.

72. The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to retrieve the long-term reference picture from the decoded picture buffer comprise instructions that, when executed, cause the one or more processors to retrieve the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

73. The non-transitory computer-readable storage medium of claim 72, wherein the instructions that, when executed, cause the one or more processor to retrieve the long-term reference picture from the decoded picture buffer comprise instructions that, when executed, cause the one or more processors to:

compare the least significant bits of the picture order count value that identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer; and

retrieve the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

74. The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to determine the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures comprise instructions that, when executed, cause the one or more processors to parse the number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

75. The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to determine the number of bits comprise instructions that, when executed, cause the one or more processors to determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least

significant bits of the picture order count value that identifies the long-term reference picture.

76. The non-transitory computer-readable storage medium of claim 69, having further stored thereon instructions that, when executed, cause the one or more processors to, when the one or more least significant bits do not uniquely identify the picture order count value of the long-term reference picture with respect to the one or more least significant bits of any other picture order count value that identifies any other picture present in a decoded picture buffer to which the long-term reference picture is also stored, determine that the one or more most significant bits of the picture order count value that identifies the long-term reference picture,

wherein the one or more most significant bits in combination with the determined one or more least significant bits are sufficient to distinguish the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer,

wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and

wherein the instructions that, when executed, cause the one or more processor to retrieve the long-term reference picture from the decoded picture buffer comprise instructions that, when executed, cause the one or more processors to retrieve the long-term reference picture form the decoded picture buffer based on the determined one or more least significant bits of the picture order count value and the determined one or more most significant bits of the picture order count value.

77. (Cancelled)

78. The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture comprise instructions that, when executed, cause the one or more processors to parse, from a bitstream representative of the encoded video data, the one or more most significant bits of the picture order count value that identifies the long-term reference picture.

79. The non-transitory computer-readable storage medium of claim 69, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

CLAIMS

Claim 1: A method of encoding video data, the method comprising:

determining, for a current picture of the video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data;

determining a number of bits to be used to represent one or more least significant bits of a picture order count value that directly identifies the long-term reference picture;

specifying, in a bitstream representative of an encoded version of the video data, the one or more least significant bits of the picture order count value using the determined number of bits;

determining whether to specify, in the bitstream, one or more most significant bits of a delta of the picture order count value directly identifying the long-term reference picture and a picture order count value directly identifying the current picture;

based on the determination of whether to specify the one or more most significant bits, specifying the one or more most significant bits in a slice header of the bitstream; and

encoding at least the portion of the current picture using the long-term reference picture.

Claim 2: The method of claim 1, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that directly identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 3: The method of claim 1, wherein specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream comprises specifying an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 4: The method of claim 1, further comprising specifying the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream.

Claim 5: The method of claim 1, wherein determining the number of bits comprises determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 6: The method of claim 1, wherein specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream comprises specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in a slice header associated with at least the portion of the current picture.

Claim 7: The method of claim 1, further comprising:

when one or more least significant bits of any other picture order count values that identify any other picture stored to a decoded picture buffer to which the long-term reference picture is also stored are the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture, determining one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture, wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value; and

specifying the determined one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture in a bitstream.

Claim 8: The method of claim 7, wherein the determined one or more least significant bits of the picture order count that identifies the long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated

with the current picture and a sequence parameter set associated with the picture.

Claim 9: The method of claim 7, further comprising:

determining the one or more least significant bits for at least one picture order count value that identifies a respective one of the other pictures stored to the decoded picture buffer; and

determining whether the one or more least significant bits for the at least one picture order count value that identifies the respective one of the other pictures stored to the decoded picture buffer is the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture.

Claim 10: The method of claim 7, wherein determining the one or more most significant bits of the picture order count value comprises determining the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture such that the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to uniquely identify the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer.

Claim 11: The method of claim 7, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

Claim 12: A video encoding device configured to encode video data, the video encoding device comprising:

a memory configured to store a current picture of the video data; and

one or more processors configured to determine, for the current picture, a long term reference picture to be used when encoding at least a portion of a current picture of the video data, determine a number of bits to be used to represent one or more least significant bits of a picture order count value that directly identifies the long-term reference picture, specify, in a sequence parameter set of the bitstream, the one or more least significant bits of the picture

order count value using the determined number of bits, determine whether to specify, in the bitstream, one or more most significant bits of a delta of the picture order count value directly identifying the long-term reference picture and a picture order count value directly identifying the current picture, based on the determination of whether to specify the one or more most significant bits, specifying the one or more most significant bits in a slice header of the bitstream, and encode at least the portion of the current picture using the long-term reference picture.

Claim 13: The video encoding device of claim 12, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that directly identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 14: The video encoding device of claim 12, wherein the one or more processors are further configured to, when specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream, specify an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 15: The video encoding device of claim 12, wherein the one or more processors are further configured to specify the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream.

Claim 16: The video encoding device of claim 12, wherein the one or more processors are further configured to, when determining the number of bits, determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 17: The video encoding device of claim 12, wherein the one or more processors are further configured to, when specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream, specify the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in a slice header associated with at least the portion of the current picture.

Claim 18: The video encoding device of claim 12, wherein the one or more processors are further configured to, when one or more least significant bits of any other picture order count values that identify any other picture stored to a decoded picture buffer to which the long-term reference picture is also stored are the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture, determine one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture, wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and specify the determined one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture in a bitstream.

Claim 19: The video encoding device of claim 18, wherein the determined one or more least significant bits of the picture order count that identifies the long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated with the current picture and a sequence parameter set associated with the picture.

Claim 20: The video encoding device of claim 18, wherein the one or more processors are further configured to determine the one or more least significant bits for at least one picture order count value that identifies a respective one of the other pictures stored to the decoded picture buffer, and determine whether the one or more least significant bits for the at least one picture order count value that identifies the respective one of the other pictures stored to the decoded picture buffer is the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture.

Claim 21: The video encoding device of claim 18, wherein the one or more processors are further configured to, when determining the one or more most significant bits of the picture order count value, determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture such that the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to uniquely identify the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer.

Claim 22: The video encoding device of claim 18, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

Claim 23: A video encoding device for encoding video data, the video encoding device comprising:

means for determining, for a current picture of the video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data;

means for determining a number of bits to be used to represent one or more least significant bits of a picture order count value that directly identifies the long-term reference picture;

specifying, in a bitstream representative of an encoded version of the video data, the one or more least significant bits of the picture order count value using the determined number of bits,

means for determining whether to specify, in the bitstream, one or more most significant bits of a delta of the picture order count value directly identifying the long-term reference picture and a picture order count value directly identifying the current picture;

means for specifying, based on the determination of whether to specify the one or more most significant bits, the one or more most significant bits in a slice header of the bitstream; and

means for encoding at least the portion of the current picture using the long-term reference picture.

Claim 24: The video encoding device of claim 23, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that directly identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 25: The video encoding device of claim 23, wherein the means for specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream comprises means for specifying an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 26: The video encoding device of claim 23, further comprising means for specifying the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream.

Claim 27: The video encoding device of claim 23, wherein means for determining the number of bits comprises means for determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 28: The video encoding device of claim 23, wherein the means for specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream comprises means for specifying the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in a slice header associated with at least the portion of the current picture.

Claim 29: A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause one or more processors of a video encoding device to:

determine, for a current picture of video data, a long term reference picture to be used when encoding at least a portion of a current picture of the video data;

determine a number of bits to be used to represent one or more least significant bits of a picture order count value that directly identifies the long-term reference picture;

specify, in a bitstream representative of an encoded version of the video data, the one or more least significant bits of the picture order count value using the determined number of bits;

determine whether to specify, in the bitstream, one or more most significant bits of a delta of the picture order count value directly identifying the long-term reference picture and a picture order count value directly identifying the current picture;

based on the determination of whether to specify the one or more most significant bits, specify the one or more most significant bits in a slice header of the bitstream; and

encode at least the portion of the current picture using the long-term reference picture.

Claim 30: The non-transitory computer-readable storage medium of claim 29, wherein the picture order count value that directly identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in a decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 31: The non-transitory computer-readable storage medium of claim 29, wherein the instructions that, when executed, cause the one or more processors to specify the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream comprise instructions that, when executed, cause the one or more processors to specify an unsigned binary number having a number of bits equal to the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 32: The non-transitory computer-readable storage medium of claim 29, further having stored thereon instructions that, when executed, cause the one or more processors to specify the determined number of bits used to represent the one or more least significant bits

of the picture order count value that directly identifies the long-term reference picture in the bitstream.

Claim 33: The non-transitory computer-readable storage medium of claim 29, wherein the instructions that, when executed, cause the one or more processors to determine the number of bits comprise instructions that, when executed, cause the one or more processors to determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data so as to avoid specifying in the bitstream the determined number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 34: The non-transitory computer-readable storage medium of claim 29, wherein the instructions that, when executed, cause the one or more processors to specify the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in the bitstream comprise instructions that, when executed, cause the one or more processors to specify the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture in a slice header associated with at least the portion of the current picture.

Claim 35: The non-transitory computer-readable storage medium of claim 29, further having stored thereon instructions that, when executed, cause the one or more processors to:

when one or more least significant bits of any other picture order count values that identify any other picture stored to a decoded picture buffer to which the long-term reference picture is also stored are the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture, determine one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture, wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value; and

specify the determined one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture in a bitstream.

Claim 36: The non-transitory computer-readable storage medium of claim 35, wherein the determined one or more least significant bits of the picture order count that identifies the long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated with the current picture and a sequence parameter set associated with the picture.

Claim 37: The non-transitory computer-readable storage medium of claim 35, further having stored thereon instructions that, when executed, cause the one or more processors to:

determine the one or more least significant bits for at least one picture order count value that identifies a respective one of the other pictures stored to the decoded picture buffer; and

determine whether the one or more least significant bits for the at least one picture order count value that identifies the respective one of the other pictures stored to the decoded picture buffer is the same as the determined one or more least significant bits of the picture order count value that identifies the long-term reference picture.

Claim 38: The non-transitory computer-readable storage medium of claim 35, wherein the instructions that, when executed, cause the one or more processors to determine the one or more most significant bits of the picture order count value comprise instructions that, when executed, cause the one or more processors to determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture such that the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to uniquely identify the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer.

Claim 39: The non-transitory computer-readable storage medium of claim 35, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

Claim 40: A method of decoding encoded video data, the method comprising:

determining, for a current picture of the encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that directly identifies a long-term reference picture to be used when decoding at least a portion of the current picture;

parsing the determined number of bits from a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture;

determining whether one or more most significant bits of a delta of the picture order count value directly identifying the long term reference picture and a picture order count value directly identifying the current picture are specified in a slice header of the bitstream;

based on the determination of whether the one or more most significant bits are specified, parsing the one or more most significant bits from the slice header of the bitstream;

retrieving the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the one or more most significant bits; and

decoding at least the portion of the current picture using the retrieved long-term reference picture.

Claim 41: The method of claim 40, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that directly identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 42: The method of claim 40, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that directly identifies the long-term reference picture as an unsigned binary number.

Claim 43: The method of claim 40, wherein retrieving the long-term reference picture from the decoded picture buffer comprises retrieving the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that directly identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

Claim 44: The method of claim 43, wherein retrieving the long-term reference picture from the decoded picture buffer comprises:

comparing the least significant bits of the picture order count value that directly identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer; and

retrieving the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

Claim 45: The method of claim 40, wherein determining the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures comprises parsing the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

Claim 46: The method of claim 40, wherein determining the number of bits comprises determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 47: The method of claim 40, further comprising, when the one or more least significant bits do not uniquely identify the picture order count value of the long-term reference picture with respect to the one or more least significant bits of any other picture order count value that identifies any other picture present in a decoded picture buffer to which the long-term reference picture is also stored, determining one or more most significant bits of the picture order count value that identifies the long-term reference picture,

wherein the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to distinguish the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer,

wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and

wherein retrieving the long-term reference picture from the decoded picture buffer comprises retrieving the long-term reference picture form the decoded picture buffer based on the determined one or more least significant bits of the picture order count value and the determined one or more most significant bits of the picture order count value.

Claim 48: The method of claim 47, wherein the determined one or more least significant bits of the picture order count that identifies the long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated with the current picture and a sequence parameter set associated with the picture.

Claim 49: The method of claim 47, wherein determining the one or more most significant bits of the picture order count value that identifies the long-term reference picture comprises parsing, from a bitstream representative of the encoded video data, the one or more most significant bits of the picture order count value that identifies the long-term reference picture.

Claim 50: The method of claim 47, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the

long-term reference picture to be used when encoding at least the portion of the current picture.

Claim 51: A video decoding device for decoding encoded video data, the video decoding device comprising:

a memory configured to store a current picture of the encoded video data; and

one or more processors configured to determine, for the current picture, a number of bits used to represent one or more least significant bits of the picture order count value that directly identifies a long-term reference picture to be used when decoding at least a portion of the current picture, parse the determined number of bits from a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture, determine whether one or more most significant bits of a delta of the picture order count value directly identifying the long term reference picture and a picture order count value directly identifying the current picture are specified in a slice header of the bitstream, based on the determination of whether the one or more most significant bits are specified, parse the one or more most significant bits from the slice header of the bitstream, retrieve the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the one or more most significant bits, and decode at least the portion of the current picture using the retrieved long-term reference picture.

Claim 52: The video decoding device of claim 51, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that directly identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 53: The video decoding device of claim 51, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that directly identifies the long-term reference picture as an unsigned binary number.

Claim 54: The video decoding device of claim 51, wherein the one or more processors are further configured to, when retrieving the long-term reference picture from the decoded picture buffer, retrieve the long-term reference picture from the decoded picture buffer based

on the least significant bits of the picture order count value that directly identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

Claim 55: The video decoding device of claim 54, wherein the one or more processors are further configured to, when retrieving the long-term reference picture from the decoded picture buffer, compare the least significant bits of the picture order count value that directly identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer and retrieve the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

Claim 56: The video decoding device of claim 51, wherein the one or more processors are further configured to, when determining the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures, parse the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

Claim 57: The video decoding device of claim 51, wherein the one or more processors are further configured to, when determining the number of bits, determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 58: The video decoding device of claim 51,

wherein the one or more processors are further configured to, when the one or more least significant bits do not uniquely identify the picture order count value of the long-term reference picture with respect to the one or more least significant bits of any other picture order count value that identifies any other picture present in a decoded picture buffer to which the long-term reference picture is also stored, determine one or more most significant bits of the picture order count value that identifies the long-term reference picture,

wherein the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to distinguish the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer,

wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and

wherein the one or more processors are further configured to, when retrieving the long-term reference picture from the decoded picture buffer, retrieve the long-term reference picture form the decoded picture buffer based on the determined one or more least significant bits of the picture order count value and the determined one or more most significant bits of the picture order count value.

Claim 59: The video decoding device of claim 58, wherein the determined one or more least significant bits of the picture order count that identifies the long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated with the current picture and a sequence parameter set associated with the picture.

Claim 60: The video decoding device of claim 58, wherein the one or more processors are further configured to, when determining the one or more most significant bits of the picture order count value that identifies the long-term reference picture, parse, from a bitstream representative of the encoded video data, the one or more most significant bits of the picture order count value that identifies the long-term reference picture.

Claim 61: The video decoding device of claim 58, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.

Claim 62: A video decoding device for decoding encoded video data, the video decoding device comprising:

means for determining, for a current picture of the encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that directly identifies a long-term reference picture to be used when decoding at least a portion of the current picture;

means for parsing the determined number of bits from a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture;

means for determining whether one or more most significant bits of a delta of the picture order count value directly identifying the long term reference picture and a picture order count value directly identifying the current picture are specified in a slice header of the bitstream;

means for parsing, based on the determination of whether the one or more most significant bits are specified, the one or more most significant bits from the slice header of the bitstream;

means for retrieving the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the one or more most significant bits; and

means for decoding at least the portion of the current picture using the retrieved long-term reference picture.

Claim 63: The video decoding device of claim 62, wherein the picture order count value that identifies the long-term reference picture comprises a picture order count value that directly identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 64: The video decoding device of claim 62, wherein the parsed determined number of bits represent the least significant bits of the picture order count value that directly identifies the long-term reference picture as an unsigned binary number.

Claim 65: The video decoding device of claim 62, wherein the means for retrieving the long-term reference picture from the decoded picture buffer comprises means for retrieving the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that directly identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

Claim 66: The video decoding device of claim 65, wherein the means for retrieving the long-term reference picture from the decoded picture buffer comprises:

means for comparing the least significant bits of the picture order count value directly that identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer; and

means for retrieving the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

Claim 67: The video decoding device of claim 62, wherein the means for determining the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures comprises means for parsing the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

Claim 68: The video decoding device of claim 62, wherein the means for determining the number of bits comprises means for determining the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies

the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture.

Claim 69: A non-transitory computer-readable storage medium having stored thereon instructions that, when executed, cause one or more processor of a video decoding device to:

determine, for a current picture of the encoded video data, a number of bits used to represent one or more least significant bits of the picture order count value that directly identifies a long-term reference picture to be used when decoding at least a portion of the current picture;

parse the determined number of bits from a bitstream representative of the encoded video data, wherein the parsed determined number of bits represents the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture;

determine whether one or more most significant bits of a delta of the picture order count value directly identifying the long term reference picture and a picture order count value directly identifying the current picture are specified in a slice header of the bitstream;

based on the determination of whether the one or more most significant bits are specified, parse the one or more most significant bits from the slice header of the bitstream;

retrieve the long-term reference picture from a decoded picture buffer based on one or more of the least significant bits and the one or more most significant bits; and

decode at least the portion of the current picture using the retrieved long-term reference picture.

Claim 70: The non-transitory computer-readable storage medium of claim 69, wherein the picture order count value that directly identifies the long-term reference picture comprises a picture order count value that identifies a long-term reference picture that is present in the decoded picture buffer but that is not specified as one or more long-term reference pictures in a sequence parameter set associated with the current picture.

Claim 71: The non-transitory computer-readable storage medium of claim 69, wherein the parsed determined number of bits represent the least significant bits of the picture order

count value that directly identifies the long-term reference picture as an unsigned binary number.

Claim 72: The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to retrieve the long-term reference picture from the decoded picture buffer comprise instructions that, when executed, cause the one or more processors to retrieve the long-term reference picture from the decoded picture buffer based on the least significant bits of the picture order count value that directly identifies the long-term reference picture and the picture order count values associated with at least one picture stored in the decoded picture buffer.

Claim 73: The non-transitory computer-readable storage medium of claim 72, wherein the instructions that, when executed, cause the one or more processor to retrieve the long-term reference picture from the decoded picture buffer comprise instructions that, when executed, cause the one or more processors to:

compare the least significant bits of the picture order count value that directly identifies the long-term reference picture to a same number of least significant bits of a picture order count value associated with the at least one picture stored to the decoded picture buffer; and

retrieve the one of the at least one pictures stored to the decoded picture buffer for use as the long-term reference picture in decoding the current picture that has the same least significant bits for the picture order count value associated with the one of the at least one pictures stored to the decoded picture buffer as the determined least significant bits of the long-term reference picture to be used to decode the current picture.

Claim 74: The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to determine the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures comprise instructions that, when executed, cause the one or more processors to parse the number of bits used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture to be used when decoding at least a portion of the current pictures from the bitstream.

Claim 75: The non-transitory computer-readable storage medium of claim 69, wherein the instructions that, when executed, cause the one or more processor to determine the number of bits comprise instructions that, when executed, cause the one or more processors to determine the number of bits to be used to represent the one or more least significant bits of the picture order count value that directly identifies the long-term reference picture based on syntax elements previously determined for one or more of the current picture and previously encoded pictures of the video data without having to parse from the bitstream the determined number of bits used to represent the one or more least significant bits of the picture order count value that identifies the long-term reference picture.

Claim 76: The non-transitory computer-readable storage medium of claim 69, having further stored thereon instructions that, when executed, cause the one or more processors to, when the one or more least significant bits do not uniquely identify the picture order count value of the long-term reference picture with respect to the one or more least significant bits of any other picture order count value that identifies any other picture present in a decoded picture buffer to which the long-term reference picture is also stored, determine one or more most significant bits of the picture order count value that identifies the long-term reference picture,

wherein the one or more most significant bits in combination with the determined one or more least significant bits is sufficient to distinguish the picture order count value that identifies the long-term reference picture from any other picture order count value that identifies any other picture in the decoded picture buffer,

wherein a number of the one or more least significant bits when added to a number of the one or more most significant bits results in a total that is less than a total number of bits to specify the picture order count value, and

wherein the instructions that, when executed, cause the one or more processor to retrieve the long-term reference picture from the decoded picture buffer comprise instructions that, when executed, cause the one or more processors to retrieve the long-term reference picture form the decoded picture buffer based on the determined one or more least significant bits of the picture order count value and the determined one or more most significant bits of the picture order count value.

Claim 77: The non-transitory computer-readable storage medium of claim 76, wherein the determined one or more least significant bits of the picture order count that identifies the

long-term reference picture to be used when decoding at least the portion of the current picture uniquely identify the picture order count value from any other picture order count value specified in one or more of a slice header associated with at least a portion of the current picture, a picture parameter set associated with the current picture and a sequence parameter set associated with the picture.

Claim 78: The non-transitory computer-readable storage medium of claim 76, wherein the instructions that, when executed, cause the one or more processor to determine the one or more most significant bits of the picture order count value that identifies the long-term reference picture comprise instructions that, when executed, cause the one or more processors to parse, from a bitstream representative of the encoded video data, the one or more most significant bits of the picture order count value that identifies the long-term reference picture.

Claim 79: The non-transitory computer-readable storage medium of claim 76, wherein the picture order count value comprises a delta picture order count value computed as the difference between a picture order count value that identifies the current picture and the picture order count value that identifies the long-term reference picture to be used when encoding at least the portion of the current picture.