CLAIMS

What is claimed is:

1. A method of decoding implemented by a video decoder, comprising:

receiving, by the video decoder, a video bitstream including a picture unit (PU) having a picture header (PH) with a PH syntax structure, wherein the PH syntax structure includes the following syntax elements common for all slices of a coded picture associated with the PH syntax structure:

a non-reference picture flag;

a picture parameter set (PPS) identifier (ID);

a picture order count (POC) least significant bit (LSB);

~~a no output of prior pictures flag;~~

a recovery point POC; ~~and~~

a picture output flag; and

decoding, by the video decoder, the coded picture from the PU to obtain a decoded picture.

2. The method of claim 1, wherein the PH is the only PH in the PU, and wherein the coded picture is the only picture in the PU.

3. The method of any of claims 1 to 2, wherein the non-reference picture flag being equal to one specifies that the coded picture associated with the PH is never used as a reference picture.

4. The method of any of claims 1 to 3, wherein the PPS ID specifies a value of a second PPS ID for a PPS in use, and wherein the second PPS ID identifies the PPS for reference by the syntax elements.

5. The method of any of claims 1 to 4, wherein the POC LSB specifies a POC modulo for a maximum POC LSB for the coded picture, and wherein the maximum POC LSB is determined by:

$$MaxPicOrderCntLsb = 2^{(sps_log2_max_pic_order_cnt_lsb_minus4 + 4)},$$

where the value of sps_log2_max_pic_order_cnt_lsb_minus4 is in the range of 0 to 12, inclusive.

~~6. The method of any of claims 1 to 5, wherein the no output of prior pictures flag specifies whether previously decoded pictures in a decoded picture buffer are output, and wherein the coded picture is in a coded video sequence start (CVSS) access unit (AU) that is not a first AU in the video bitstream.~~

~~7~~6. The method of any of claims 1 to 5~~claim 6~~, wherein the recovery point POC specifies a recovery point of decoded pictures in output order.

~~8~~7. The method of any of claims 1 to ~~7~~6, wherein the picture output flag specifies whether the coded picture is output.

~~9~~8. The method of any of claims 1 to ~~8~~7, further comprising displaying the decoded picture on a display of an electronic device.

~~10~~9. A method of encoding implemented by a video encoder, the method comprising:

generating, by the video encoder, a picture unit (PU) having a picture header (PH) with a PH syntax structure, wherein the PH syntax structure includes the following syntax elements common for all slices of a picture associated with the PH syntax structure:

a non-reference picture flag;

a picture parameter set (PPS) identifier (ID);

a picture order count (POC) least significant bit (LSB);

~~a no output of prior pictures flag;~~

a recovery point POC; ~~and~~

a picture output flag; and

encoding, by the video encoder, the PU into a video bitstream; and

storing, by the video encoder, the video bitstream for communication toward a video decoder.

~~11~~10. The method of claim ~~10~~9, wherein the PH is the only PH in the PU, and wherein the picture is the only picture in the PU.

~~12~~11. The method of any of claims ~~10 to 11~~9 to 10, wherein the non-reference picture flag being equal to one specifies that the picture associated with the PH is never used as a reference picture.

~~13~~12. The method of any of claims 9 to 11~~10 to 12~~, wherein the PPS ID specifies a value of a second PPS ID for a PPS in use, and wherein the second PPS ID identifies the PPS for reference by the syntax elements.

~~14~~13. The method of any of claims 9 to 12~~10 to 13~~, wherein the POC LSB specifies a POC modulo for a maximum POC LSB for the coded picture, wherein the maximum POC LSB is determined by:

$$\text{MaxPicOrderCntLsb} = 2^{(\text{sps_log2_max_pic_order_cnt_lsb_minus4} + 4)},$$

where the value of sps_log2_max_pic_order_cnt_lsb_minus4 shall be in the range of 0 to 12, inclusive.

~~15. The method of any of claims 10 to 14, wherein the no output of prior pictures flag specifies whether previously decoded pictures in a decoded picture buffer are output after decoding the picture, and wherein the picture is in a coded video sequence start (CVSS) access unit (AU) that is not a first AU in the video bitstream.~~

~~16~~14. The method of any of claims 9 to 13~~10 to 15~~, wherein the recovery point POC specifies a recovery point of decoded pictures in output order.

~~17~~15. The method of any of claims 9 to 14~~10 to 16~~, wherein the picture output flag specifies whether the picture is output.

16~~18~~. A decoding device, comprising:

a receiver configured to receive a video bitstream including a picture unit (PU) having a picture header (PH) with a PH syntax structure, wherein the PH syntax structure includes the following syntax elements common for all slices of a coded picture associated with the PH syntax structure: a non-reference picture flag, a picture parameter set (PPS) identifier (ID), a picture order count (POC) least significant bit (LSB), ~~a no output of prior pictures flag,~~ a recovery point POC, and a picture output flag;

a memory coupled to the receiver, the memory storing instructions; and

a processor coupled to the memory, the processor configured to execute the instructions to cause the decoding device to:

decode the coded picture from the PU to obtain a decoded picture.

~~19~~17. The decoding device of claim ~~18~~16, wherein the PH is the only PH in the PU, and wherein the coded picture is the only picture in the PU.

~~20~~18. The decoding device of any of claims ~~18 to 19~~16 to 17, wherein the non-reference picture flag being equal to one specifies that the coded picture associated with the PH is never used as a reference picture.

~~21~~19. The decoding device of any of claims 16 to 18~~18 to 20~~, wherein the PPS ID specifies a value of a second PPS ID for a PPS in use, and wherein the second PPS ID identifies the PPS for reference by the syntax elements.

~~22~~20. The decoding device of any of claims 16 to 19~~18 to 21~~, wherein the POC LSB specifies a POC modulo for a maximum POC LSB for the coded picture, wherein the maximum POC LSB is determined by:

$$\text{MaxPicOrderCntLsb} = 2^{(\text{sps_log2_max_pic_order_cnt_lsb_minus4} + 4)},$$

where the value of sps_log2_max_pic_order_cnt_lsb_minus4 shall be in the range of 0 to 12, inclusive.

~~23. The decoding device of any of claims 18 to 22, wherein the no output of prior pictures flag specifies whether previously-decoded pictures in a decoded picture buffer are output after~~

~~decoding the coded picture, and wherein the coded picture is in a coded video sequence start (CVSS) access unit (AU) that is not a first AU in the video bitstream.~~

~~24~~21. The decoding device of any of claims 16 to 20~~18 to 23~~, wherein the recovery point POC specifies a recovery point of decoded pictures in output order.

~~25~~22. The decoding device of any of claims 16 to 21~~18 to 24~~, wherein the picture output flag specifies whether the coded picture is output.

~~26~~23. An encoding device, comprising:

a memory containing instructions;

a processor coupled to the memory, the processor configured to implement the instructions to cause the encoding device to:

generate a picture unit (PU) having a picture header (PH) with a PH syntax structure, wherein the PH syntax structure includes the following syntax elements common for all slices of a picture associated with the PH syntax structure: a non-reference picture flag, a picture parameter set (PPS) identifier (ID), a picture order count (POC) least significant bit (LSB), ~~a no output of prior pictures flag,~~ a recovery point POC, and a picture output flag;

encode the PU into a video bitstream; and

a transmitter coupled to the processor, the transmitter configured to transmit the video bitstream toward a video decoder.

~~27. The encoding device of claim 26, wherein the PH is the only PH in the PU, and wherein the picture is the only picture in the PU.~~

~~28~~24. The encoding device of ~~any of claims 26 to 27~~claim 23, wherein the non-reference picture flag being equal to one specifies that the picture associated with the PH is never used as a reference picture.

~~29~~25. The encoding device of any of claims ~~26 to 28~~23 to 24, wherein the PPS ID specifies a value of a second PPS ID for a PPS in use, and wherein the second PPS ID identifies the PPS for reference by the syntax elements.

~~30~~26. The encoding device of any of claims23 to 25~~ 26 to 29~~, wherein the POC LSB specifies a POC modulo for a maximum POC LSB for the coded picture, wherein the maximum POC LSB is determined by:

$$MaxPicOrderCntLsb = 2^{(\ sps_log2_max_pic_order_cnt_lsb_minus4 + 4\ )},$$

where the value of sps_log2_max_pic_order_cnt_lsb_minus4 shall be in the range of 0 to 12, inclusive.

~~31. The encoding device of any of claims 26 to 30, wherein the no output of prior pictures flag specifies whether previously decoded pictures in a decoded picture buffer are output after decoding the picture, and wherein the picture is in a coded video sequence start (CVSS) access unit (AU) that is not a first AU in the video bitstream.~~

~~32~~27. The encoding device of any of claims 23 to 26~~26 to 31~~, wherein the recovery point POC specifies a recovery point of decoded pictures in output order.

28~~33~~. The encoding device of any of claims 23 to 27~~26 to 32~~, wherein the picture output flag specifies whether the picture is output.

~~34~~29. A coding apparatus, comprising:

a receiver configured to receive a picture to encode or to receive a bitstream to decode;

a transmitter coupled to the receiver, the transmitter configured to transmit the bitstream to a decoder or to transmit a decoded image to a display;

a memory coupled to at least one of the receiver or the transmitter, the memory configured to store instructions; and

a processor coupled to the memory, the processor configured to execute the instructions stored in the memory to perform the method in any of claims 1 to 8 or any of claims 9 to 15~~9 and any of claims 10 to 17~~.

~~35. The coding apparatus of claim 34, further comprising a display configured to display a decoded picture.~~

~~36~~30. A system, comprising:

an encoder; and

a decoder in communication with the encoder, wherein the encoder or the decoder includes the decoding device, the encoding device, or the coding apparatus of any of claims ~~18 to 33~~16 to 29.

~~37~~31. A means for coding, comprising:

receiving means configured to receive a picture to encode or to receive a bitstream to decode;

transmission means coupled to the receiving means, the transmission means configured to transmit the bitstream to a decoding means or to transmit a decoded image to a display means;

storage means coupled to at least one of the receiving means or the transmission means, the storage means configured to store instructions; and

processing means coupled to the storage means, the processing means configured to execute the instructions stored in the storage means to perform the method in any of claims 1 to 8 or any of claims 9 to 15~~9 and any of claims 10 to 17~~.

32. A computer-readable storage medium, wherein the computer-readable storage medium stores a computer program that can be executed by a processor, and when the computer program is executed by the processor, the processor performs the method according to any one of claims 1 to 8 or any of claims 9 to 15.

33. A storage medium, wherein the storage medium stores a bitstream obtained by using the method according to any one of claims 1 to 8 or any of claims 9 to 15.

34. A program comprising program code for performing the method according to any one of claims 1 to 8 or any of claims 9 to 15 when executed on a computer or a processor.

35. A coder comprising processing circuitry for carrying out the method according to any one of claims 1 to 8 or any of claims 9 to 15.